AUSTRALIAN
Turfgrass
MANAGEMENT
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Going Green

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contents

COVER: Reassessing the State of Play

In Volume 7.3 of Australian Turfgrass Management, Peter Brown and Kate Low highlighted the results to emerge from an environmental management assessment program at 30 NSW golf clubs conducted in 2004. Here in an extensive two-part feature, ATM follows up on the reassessment process conducted throughout 2005 and highlights the significant improvements that NSW golf courses and superintendents have been able to achieve. ***Photo: Brett Robinson***

In Every Edition

an industry mourns

It is on a rather sombre and tragic note that I kick off this final edition of Australian Turfgrass Management magazine for 2005.

Many in the Australian turf industry may not have heard of the recent tragedy which befell our New Zealand counterparts on Friday, 14 October. David Wayne Glasgow (Wayne), a well-respected and long-serving superintendent, was killed in a freak accident on course while on his way to mow greens following a break in the weather.

Superintendent at Onewhero Golf Club, a country 18-hole course about an hour south of Auckland, Wayne was driving towards a culvert crossing a stream in front of the course's 8th green when the mower lost control and ended up in waist-high water, pinning Wayne under the machine. Tragically he was found dead about an hour later by his trainee. A subsequent investigation by Occupation Safety and Health officials cleared both operator and machine of any liability and labelled it a freak accident.

According to Brett Burgess, president of the New Zealand Golf Course Superintendents' Association (NZGCSA), Wayne was a big supporter of the industry and was a one-time secretary of the Auckland Golf Course Superintendents' Association (AGCSA). Wayne started at Onewhero in 1973 after doing his initial training with his father at Helensville Golf Club north of Auckland and was responsible for continual improvements to the course over his many years. Such was his work in the early days, Wayne was highly commended in the annual AGCSA awards in 1975 before winning an excellence award in 1978.

ATM magazine and the Australian Golf Course Superintendents' Association joins with the NZGCSA in conveying to Wayne's family – Chrissie, Duncan and Liam – our heartfelt condolences in light of this terrible accident. Wayne's passing is an untimely and tragic reminder to all in the industry of the necessity to be extra vigilant during the hectic summer months ahead.

On that rather solemn note, our cover story for this edition revisits the environmental assessment program at 30 NSW golf courses which was presented earlier this year in Volume 7.3. In a two-part look at the reassessments, Peter Brown highlights the significant improvements made, while three superintendents involved in the program provide an excellent insight into the changes they have instituted at their clubs.

As ATM wraps up for another year, I would like to personally wish all superintendents, turf managers and their families a safe and joyous festive season and the best of luck for what is set to be another challenging summer.

With the Bureau of Meteorology predicting above average temperatures and the prospect of water restrictions ever tightening, superintendents and turf managers will again be called upon to put their expert management skills through another rigorous examination.

Until next year, enjoy the read.

Brett Robinson
Editor

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foreword thinking

AGCSA CHIEF EXECUTIVE, STEVEN POTTS

Welcome to the final edition of Australian Turfgrass Management magazine for 2005. I trust everyone is gearing up for a challenging summer ahead and I wish all those who are hosting major tournaments all the best with their preparations.

It is well acknowledged by major stakeholders that one of the greatest strengths a turf manager possesses is their passion and understanding of their particular piece of Australia. Unfortunately, this is very rarely capitalised on by the turf manager when it should be used as a valuable tool.

One way to utilise this strength and improve the communication at boardroom level is to conduct a course tour for the club board and/or greens committee. Such a tour, which should start in the maintenance facility, gives the turf manager the opportunity to explain the operational and legislative requirements of their role while in their domain.

The tour could be as short as a couple of hours and cover current maintenance practices and highlight course initiatives (e.g: environmental, OH&S). This will give the committee an insight into the demands and constraints of the turf manager's role at their facility and enable the turf manager to address specific questions or concerns while looking at a particular area.

A course tour could become a regular occurrence or part of an annual committee induction program. Remember that a picture paints a thousand words and this could be the first step to improving communications and increasing support and understanding from the committee. This approach has had many positive results around the country and could be an added tool for the turf manager as we head into what is set to be a demanding summer.

The National Turf Education Working Committee has recently completed the draft Certificate II Horticulture Delivery and Assessment Guides, which are currently being circulated for feedback. This is an enormous achievement by the committee and a great step forward for our industry and will complete the education pathway for apprentices.

It is now up to all turf managers to play their part. If you currently have an apprentice you need to ask your local TAFE college the following questions:

1. Is the TAFE college aware of the Delivery and Assessment Guide documents?
2. Is the TAFE college teaching to these documents?
3. Did the TAFE college take the opportunity to provide input into these documents?

The Delivery and Assessment Guidelines for Certificate II will be available on the AGCSA website and we are encouraging input from all industry stakeholders, with the intention of launching the endorsed Certificate II guides at the 2006 Turf Education Forum, which will be held as part of the 22nd Australian Turfgrass Conference.

Speaking of next year's Brisbane conference, the AGCSA is gearing up for what is set to be the biggest turfgrass industry gathering in the Southern Hemisphere. The conference will run from 17-21 July, 2006 and a delegates registration brochure will be distributed in early February. I encourage all members to take advantage of the early bird registration discount.

The two-day trade exhibition which forms part of the conference is selling quickly so to make sure your company is represented contact Scott Petersen at the AGCSA office on (03) 9548 8600 or email scott@agcsa.com.au.

The 2006 Turfgrass Management Diary is nearing completion and is expected to be available in early December. The diary has undergone a revamp thanks to feedback from the industry and we hope it will assist turf managers in the day-to-day operation of their facility in the coming year.

Finally, I would like to wish everyone in the turf industry and their families a Merry Christmas and a safe and prosperous New Year. I look forward to the challenges that lie ahead in 2006.

Enjoy the magazine.

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Improving the environmental management practices at NSW golf clubs has been the key objective behind the assessment program

Reassessing the state of play

The changing face of environmental management practices in NSW

In Volume 7.3, ATM's cover story 'Assessing the state of play' examined the results of the environmental assessment program conducted at 30 NSW golf courses in 2004. Throughout 2005, reassessments were carried out at all clubs to gauge the improvements made since the initial assessments. In the first part of this extensive feature, Peter Brown looks at the encouraging results to emerge from the reassessments, while in the second part ATM goes behind the gates at three clubs involved in the program to see the marked improvements they have made.

In Volume 7.3 of Australian Turfgrass Management the results of a 2004 environmental assessment program of 30 NSW golf courses were published. The NSW Department of Environment and Conservation (DEC) initiated the assessment project in conjunction with the NSWGCSA. The project was managed by Frouke de Reuver who worked closely with the NSWGCSA, while consultants Kate Low and Peter Brown were engaged to carry out the project.

An assessment template was developed based on the education manual produced in 2003 by the AGCSA and the former NSW Environment Protection Authority (now part of the DEC) called 'Improving the Environmental Management of NSW Golf Courses'.

At the completion of the initial assessment, the consultants entered the outcomes in the template and a copy was sent to each club, the DEC and the local council as the regulatory authority. Superintendents were encouraged to contact their relevant council officer to discuss any issues arising from the assessment and to seek their advice and assistance when required. This cooperation has produced beneficial outcomes for superintendents and their clubs in all cases.

FOLLOW-UP ASSESSMENTS

The DEC follow-up visits to each of the 30 assessed clubs in 2005 were considered valuable to check on progress and encourage them to complete the required actions. Superintendents and presidents of the 30 golf clubs previously assessed were contacted and invited to continue their participation into the follow-up project. Pleasingly, all 30 clubs were agreeable and a course visit was arranged. In the majority of cases, 12 months had elapsed since the initial assessment.

As highlighted in the previous ATM article, the initial project only had funding for a three to four hour visit to any course. This was enough to provide a snapshot of environmental performance, but not enough to thoroughly address all areas. The follow-up assessment focused on the issues identified in the initial assessment and monitored the progress made in addressing them.

As the data presented here will indicate, non-compliance issues in key areas such as pesticide and fuel storage were the most prevalent. In the majority of cases, old infrastructure had not been upgraded to comply with changing environmental requirements under the Protection of the Environment Operations Act (POEO).

Mostly, new infrastructure is costly to install and requires the submission of a development application (DA) to council. Time is required to plan and fund new compliant infrastructure and in many cases clubs are not capable of solving all their problems in the short term. Therefore, within the 12 months period between the initial environmental assessment and the follow-up assessment, few clubs had the capacity to fully comply.

With this in mind, I have presented the data to indicate the stage that the 30 clubs

have reached in achieving their environmental targets. The same environmental headings that were presented in the first article will be used together with the initial results.

In addition, the data will indicate whether (1) the environmental goal has been achieved, (2) planning to achieve the goals is in progress or, (3) there has been no change. Averages will be used and in some situations the performance of individual clubs (not named) is presented. As with any sample, there is variation in the performance of the individuals.

Some clubs are performing less well than others for a number of reasons such as recalcitrant club management and/or boards, lack of immediate funds, delays in the planning process and in some cases changes to turf management employment structures.

NOTES ON RECORDING DATA

In the examples below, the follow-up performance will include those clubs that have satisfactorily achieved the environmental standard required as well as those clubs involved in the planning stages. Legitimate planning includes such things as written proposals from the superintendent to club management and/or boards, allocated funding for specific environmental requirements and infrastructure as well as relevant DA's to local councils.

The data presented is an average of the performance of the 30 participating clubs. It must be noted that while the performance of a few participating clubs could have been better, in most assessment areas the majority performed very well with some achieving outstanding improvements to the point of meeting all environmental requirements. The graphs on the following page show overall improvement and improvements in each of the assessment categories.

A common difficulty has been the short time frame between assessment and follow-up (one year). It is difficult for many clubs to complete the planning stage, fund any required infrastructure changes and gain the relevant DA's during this time. Wherever possible the most recent data has been used.

ENVIRONMENTAL PRINCIPLES OF CLUBS ESTABLISHED ENVIRONMENTAL POLICY STATEMENT

At the initial assessment only three clubs had established written environmental policies. The follow-up assessment recorded that nine clubs had written policies in place, 11 were planning a suitable policy and a further 10 still had no written policies. Two thirds of the sample 30 clubs are moving ahead with written environmental policies and for those who are not, the following may be helpful.

There have been a number of (one page) environmental policy examples in recent turf publications and it would seem a simple matter to formulate one that best represents the individual club requirements. Boards and ▶

A MESSAGE FROM THE NSW DEC

The NSW Department of Environment and Conservation (DEC) is pleased to present this article on the environmental performance of NSW golf courses. In Volume 7.3 of Australian Turfgrass Management, an environmental management snapshot of 30 NSW golf courses was presented which detailed the outcomes of voluntary assessments conducted in 2004.

The assessments highlighted some good environmental practices on golf courses, including minimising fertiliser use, the use of IPM practices and bush regeneration programs. However, there were also a significant number of non-compliance areas, mostly around fuel and chemical storage and machinery washdown practices.

In the first half of this year, consultant Peter Brown re-assessed all 30 clubs to see what changes to environmental practices had been made. The DEC is very pleased to note the significant improvements in key areas of environmental management. Significant advances have been in the areas of greatest need such as:

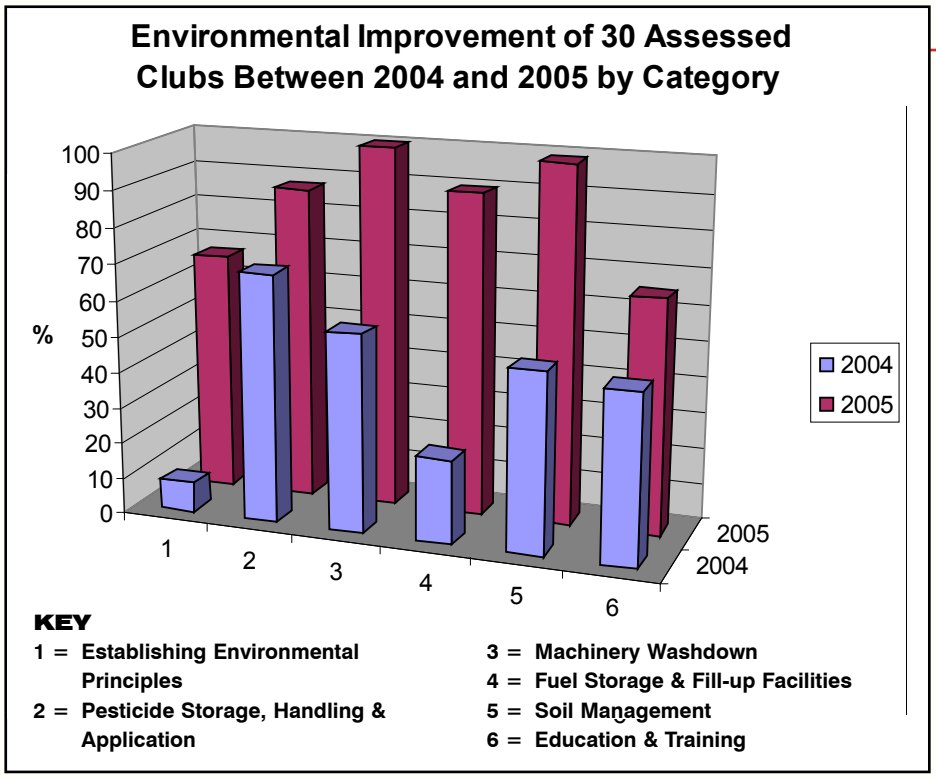
- Machinery washdown - all 30 clubs have either built new facilities, implemented new practices or have submitted DA's to do so;
- Fuel and chemical storage and fill-up facilities - 89.5 per cent of the clubs are now compliant or in the process of becoming compliant. (The DEC is continuing to work with local councils to help ensure the remaining clubs become compliant.)

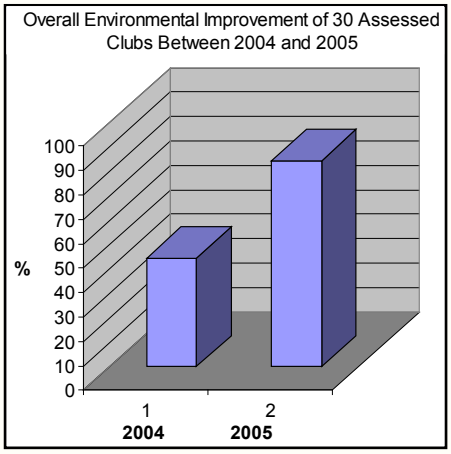
Many clubs have also written environmental policies or environmental management plans (EMPs), which will assist them in planning and budgeting for key environmental actions.

As part of our educational project with the golf course industry, the DEC has prepared three case studies of good environmental practice, which can be found on pages 12-18. The case studies focus on the considerable improvements made at the Easts Leisure and Golf Club, Nowra Golf Club and Yarrawonga and Border Golf Club. We hope the case studies will provide inspiration for others who are keen to improve their environmental management. Much of the work done at the three clubs (e.g: provision of spill kits, bunding, training and developing EMPs etc) has been relatively inexpensive and can easily be adopted by most clubs.

An essential element in the success of this project has been the partnership with the NSWGCSA, the AGCSA and local councils in educating and supporting superintendents over the past three years. The DEC is very pleased to be able to highlight the improvements made as a result of this partnership and extends special thanks to the 30 golf clubs who participated in the project.

Bernard Carlon,
Director Business and Community Programs, Sustainability Programs Division, NSW DEC.





managers should be encouraged to participate in the formulation process and endorse the final policy document. Ideally the environmental policy should be displayed prominently in the clubhouse and in the maintenance facility.

Satisfactory at original assessment: 9.9%

Satisfactory at follow-up assessment: 66.5% (29.9% established policies, 36.6% planning policies)

ESTABLISHED ENVIRONMENTAL MANAGEMENT PLANS

Initially, only two clubs were working with an environmental management plan (EMP). This situation is improving. Some superintendents have used the example of the environmental template used for their club's assessment to formulate their own EMP, others have opted for a commercially available product or put together something themselves. The follow-up assessment recorded that five clubs had developed EMPs, 15 were compiling EMPs and a further 10 were not using an EMP.

Satisfactory at original assessment: 6.6%

Satisfactory at follow-up assessment: 66.5% (16.6 established EMPs, 49.9% planning EMPs)

An EMP is a comprehensive document that needs some time to fully compile. Areas that do not comply with regulations or are risking pollution of the environment are obvious high priorities. An EMP that identifies and recommends action for these issues can be presented to a club board for the planning and funding process.

Most EMPs should contain a full description and discussion of the issue to be addressed, a plan of action with a timeframe, budget and persons responsible to ensure the appropriate actions are followed through and satisfactory results are achieved. The EMP should be a flexible document that is an ongoing component of the reporting and decision-making process.

WATER MANAGEMENT

The continuing drought in many regions of NSW and associated tightening of water restrictions has forced golf courses that are either partly or fully reliant on town supply to urgently seek alternative supplies. In addition, many courses that have water available independent of town supply are now in a situation of reduced rainfall and have become vulnerable to drought. So the search is on.

An example of this trend is evident when comparing the responses to questions asked of the 30 superintendents in the initial assessment in 2004. (NB: The first figure is the percentage found satisfactory during the initial assessments in 2004, while the figure in brackets and bold represents the percentage found satisfactory in the 2005 follow-up assessments.)

- Clubs that consider their water supply to be reliable and adequate: 69.9% **(53.3%, indicating a drop of 16.6 per cent)**
- Clubs indicating adequate irrigation system performance: 73.3% **(73.3%, no change. This indicates that clubs with inadequate irrigation systems performance need to move forward)**
- Clubs recording total annual water use: 56.6% **(83.3%, indicating an increase of 26.7%)**

Golf clubs are certainly under increased scrutiny in water use and will need to improve irrigation system efficiency and water use recording systems. For instance, the initial 2004 assessment revealed 22 of the 30 superintendents indicated adequate irrigation system performance. Little has changed since then and this highlights the fact that many clubs need to budget for efficient irrigation systems for the future.

Only 17 of the 30 superintendents assessed in 2004 recorded total annual water use. This situation has improved significantly in 2005 with only a few not recording totals. No doubt water restrictions in NSW and output monitoring by authorities has greatly influenced this.

The water issue for golf courses is as complex as it is problematic. It is hoped that local and state authorities can be flexible and cooperative in assisting the turf and recreation industry with the search for reliable irrigation water supplies.

PESTICIDE STORAGE, HANDLING AND APPLICATION

There was a reasonably high performance standard in 2004 for this area, however, improvements have still been made. Again, the first figure is the percentage found satisfactory during the initial assessments with the figure in brackets and bold the percentage found satisfactory in the follow-up assessments.

REQUIREMENTS UNDER THE NSW PESTICIDES ACT 1999

- Staff training and accreditation? 90% **(100%)**
- Sufficient staff trained? 70% **(97% - 80% fully trained, 17% training planned)**
- Pesticide records compliant? 80% **(93% - 90% fully, 3% planning)**
- Pesticide records available and contact person for public enquiry? 93.3% **(100%)**

Significant improvements have been made in the area of fuel storage

Spill prevention measures are a key part of any EMP

- Are spray calibration records kept? 70% **(86% - 73% yes, 13.3% planning)**

Total average performance: 80.66% **(95.2%)**

PESTICIDE STORAGE FACILITIES

- Self contained and bunded? 60% **(96% - 71% fully, 25% planning)**
- Stored in compliant manner? 70% **(96.4% - 71.4% fully, 25% planning)**
- Store complies with local council and fire regulations? 43.3% **(89% - 71% fully, 18% planning)**
- Pesticide store only accessible to authorised people? 96.7% **(100%)**
- Emergency response plans and procedures in place and practiced? 40% **(92% - 71% fully, 21% planning)**
- Fertilisers and pesticides stored separately according to AS2507-1998. 66.6% **(90%)**
- Adequate ventilation, spill containment area, emergency eye wash/shower and first aid kit available? 30% **(89% - 42.9% fully, 46% planning)**
- Are all relevant MSDS sheets available and accessible to employees? 83% **(96% - 86% fully, 10% planning)**

Total average performance: 61.2% **(82.3%)**

PESTICIDE SPRAY TANK FILLING

- If a tank filling facility exists, is it separate from the machinery wash down or configured to have bund separation? 50% **(100% - 82% fully, 18% planning)**
- Is the filling area able to contain all tank spills? 75% **(100% - 96% fully, 4% planning)***
- Are all spray tank filling hose lines compliant with back-flow prevention requirements? 43% **(100% - 64% fully, 36% planning) ***
- Is the facility designed to prevent the entry of rainfall? 50% **(97% - 61% fully, 36% planning)***
- Is the containment area designed to hold spills for pump out by a company accredited for hazardous waste disposal? 66.6% **(100% - 80% fully, 20% planning)**
- Are containers triple rinsed? 100% **(100%)***
- Are staff trained in spill procedures and appropriate spill kits in place? 46% **(92% - 82% fully, 10% now training)***
- Are appropriate emergency shower and eye wash facilities located at the load up area? 26.6% **(85% - 32% fully, 53% planning)***

Total average performance: 57% **(84%)**

Twenty-five clubs did not have a dedicated built pesticide spray tank filling facility. These clubs were assessed as to their current procedures, and the potential for the ▶

procedures to pollute and for compliance with items marked with an asterisk (*). A number of these clubs have indicated that they are in the process of planning to build dedicated spray tank filling and machinery washdown facilities to comply.

MACHINERY WASHDOWN

As with pesticide spray tank loading, machinery washdown is acceptable on grassed areas that are well away from watercourses and drains and are operated under controlled conditions. However, if a dedicated built structure is used for machinery washdown, it must fully comply with a number of requirements.

This section refers to 12 clubs with a dedicated, constructed machinery washdown facility.

- Of the clubs assessed in 2004, 33.3% (four clubs) had washdown facilities that risked pollution in some way, mostly of a minor nature.
- At the follow up assessment seven of the 12 clubs (58%) were fully compliant with the remaining 5 clubs (42%) planning compliance action.

This section refers to the 18 clubs washing down on grassed areas.

- At the 2004 assessment, 77% (14 clubs) were washing down satisfactorily without pollution risk.
- The remaining 4 clubs (23%) had changed their practices to pose no pollution risk and all are planning to install a built washdown facility.

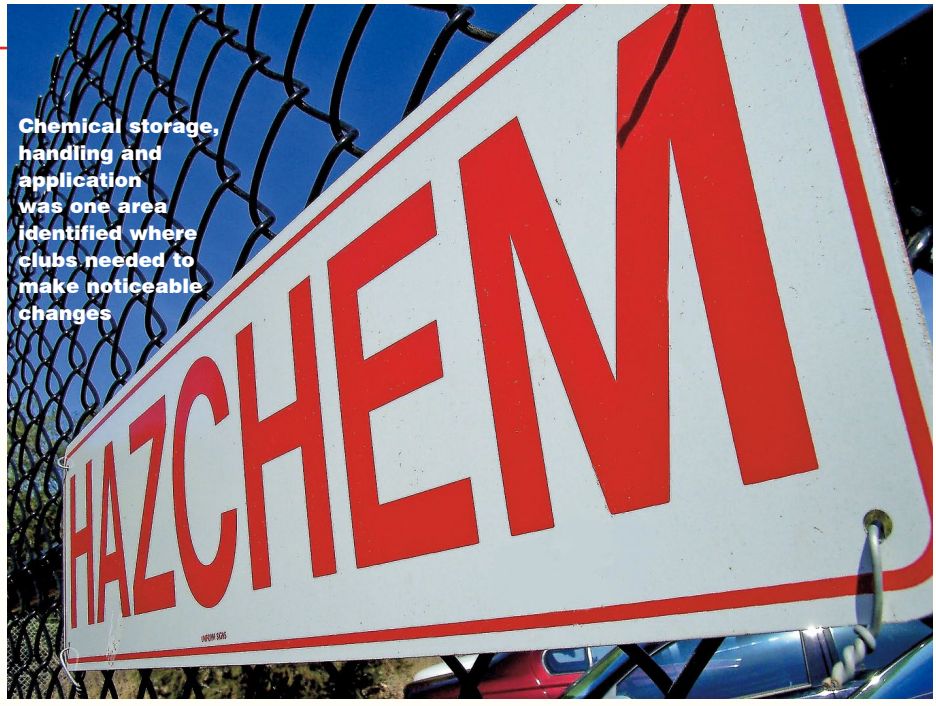
FUEL STORAGE AND FILL-UP FACILITIES

The assessed clubs in general have old fuel and oil storage infrastructure that has not been upgraded in accordance with changing regulation requirements. Adequate bunding of oil drums is relatively simple and inexpensive to achieve and most clubs have undertaken this action.

Fuel storage upgrading in many cases has involved clubs in considerable planning and budgeting to achieve the required standard. This takes time as the following results indicate.

- Do petrol and diesel storage tanks comply with all relevant regulations? 16.6% **(86% - 32% fully, 54% planning)**
- Are machine oil drums (new and used) recycled, adequately sited, rain protected with suitable bund? 30% **(93% - 57% fully, 36% planning)**

Total average performance: 23% **(89.5%)**



Chemical storage, handling and application was one area identified where clubs needed to make noticeable changes

SOIL MANAGEMENT

Improvements to addressing soil erosion have been good considering the cost involved in most situations and the time required. Some clubs had waterways that functioned as the main channel for urban stormwater flows and bank erosion is not entirely the responsibility of the clubs concerned.

Coordinating remedial work and funding with the responsible authorities takes time and satisfactory outcomes may be some way off in many cases. Erosion problems relating to water hazards, drainage ditches material stockpiles and unsealed roads and paths are similarly costly to remedy and the clubs in most cases have set long-term goals.

- Soil erosion at waterways: 50% **(96.4% - 76.6% fully, 19.8% planning)**
- Erosion of unsealed access roads, paths and maintenance compounds: 56.6% **(100% - 69.9% fully, 30.1% planning)**
- Stockpiles of sand, soil, mulch etc inappropriately managed: 43.3% **(100% - 53.8% fully, 46.2% planning)**

Total average performance: 49.9% **(98.8%)**

Environmental compliance leads to a safer work environment

EDUCATION AND TRAINING

Although not directly influencing the environmental performance of a golf club, I have observed that the clubs that scored well in this section also performed well and responded well to improving their environmental performance.

- Is a staff induction and procedures manual in use? 60% **(78.7% - 68% in place, 10.7% planning)**
- Are regular employee appraisals and feedback procedures in place? 33% **(71.7% - 53.7% in place, 18% planning)**
- Is job specific training available? 80% **(83% training available)**
- Is the golf club engaged in any programs to educate golfers and the wider community on the benefits of the golf course and the efforts made towards its stewardship? 16.6% **(42.9% have programs, others not planning)**
- Is the golf club actively involved with outside organisations and community groups to assist them in improving environmental practices and engaging the local community? 46% **(50% have activities, others not planning)**

Total average performance: 47.1% **(65.2%)**

PGA TOUR OFFICIAL GOLF COURSE EQUIPMENT SUPPLIER

Ever seen electricity leak all over a green?

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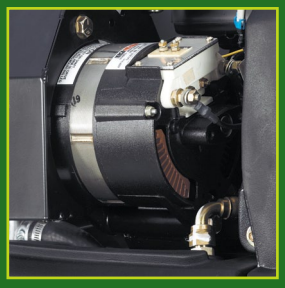

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Yarrawonga and Border superintendent Michael Swanwick says the club has benefited immensely from the assessment experience

Reassessing the state of play

NSW superintendents rise to the challenge of environmental management

In the second part of Peter Brown's cover story, ATM highlights the major improvements made at three golf clubs involved in the environmental management assessment program – Yarrawonga and Border, Easts Leisure and Golf, and Nowra.

The data presented over the previous pages describes the average performance of the 30 assessed clubs.

However, each golf club is its own entity with unique operational challenges. For example, some clubs were better able to respond financially to establishing the required environmental infrastructure than others. Some clubs have taken some time to recognise the importance of planning for environmental compliance and improvement, but in general, most have been very positive.

Some golf course locations are more environmentally sensitive than others. Some have external factors over which they have little control such as the quality of urban storm water run-off through the course. Superintendents have a wide range of unique challenges to overcome in achieving environmental goals and best practice at their course.

The following case studies attempt to provide a brief picture of the unique challenges faced by three clubs in achieving their environmental goals. Each club was invited to participate and agreed to be included in the case study and they are thanked sincerely for their involvement.

CASE STUDY ONE: YARRAWONGA AND BORDER GOLF CLUB

Superintendent: Michael Swanwick

Located on the banks of the Murray River, Yarrawonga and Border Golf Club is a massive 45-hole complex which comprises two 18-hole layouts – the Murray and Lake courses – and the Executive nine.

What environmental policies, practices or achievements were in place prior to environmental assessment process? Were there any written policies or management plans in place?

A couchgrass conversion program at Yarrawonga has helped with water saving issues and enhanced playing surfaces to suit environmental conditions

The introduction of wildlife corridors on the 18-hole Murray Course was done many years prior to the EPA assessment. This was done to not only enhance the natural appearance of the course, which is set on a red gum flood plane forest adjacent to the Murray River, but also to encourage native flora and fauna to inhabit the area. Leaving such areas has seen a significant reduction in maintenance practices, labour and fuel use which has enabled the club to redirect resources back into producing quality turf surfaces.

Waterway and lagoon systems were left natural, with aquatic plants within the lagoon system helping filter nutrients from the water and supporting native wildlife. This approach sees a sustainable water supply during the summer period for the native wildlife, and as these lagoons are our major source of irrigation water, the filtering of nutrients and sediment means the club is supplied with an extremely high quality of irrigation water.

Every year the club embarks on a large-scale tree planting program between May and August. About 700-1000 native trees are planted throughout the course with the removal of exotic trees, such as pine, done when required. Due to the course bordering the Murray River, a great deal of time and effort over the years has been dedicated to planting native species along the river bank to help with erosion control. The club and other community-based organisations like the Yarra Mul Fishing Club have contributed to this greatly.

In the early 1990s we introduced a couchgrass conversion program to all turf areas except greens. This was done to not only address the water saving issues that we were faced with but was also a strategic plan to upgrade and enhance the playing surfaces to suit the environmental conditions that were experienced during the peak golfing times of the year.

List and comment on the areas that needed improvement or compliance that were highlighted in the environmental assessment. Had you recognised these issues previously?

During the phase of upgrading the course facilities and capital expenditure programs, which are conducted each year, many of these areas are discussed at committee and board level and strategic programs are put in place to address the club's responsibilities in NSW OH&S legislation, environmental management and also plant and equipment refurbishment.

After the initial EPA assessment there were some areas such as fuel storage and washdown bay facilities that were brought to the club's attention. Using the findings of the audit, the club set about putting in place funding and works programs to upgrade these facilities to comply with current acceptable standards.

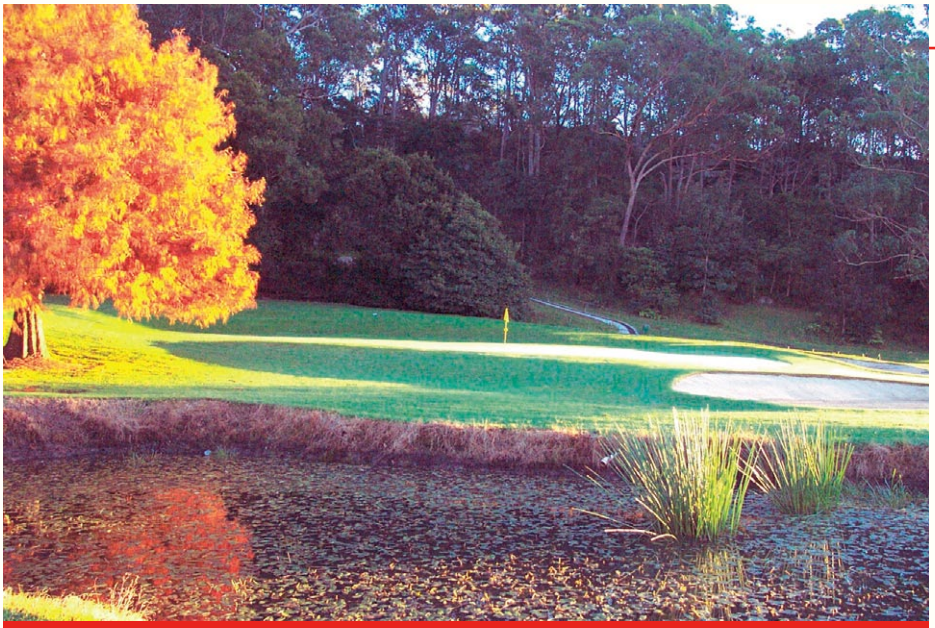
Upgrading of chemical storage facilities and course chemical filling stations was an area that was previously targeted for upgrading prior to the EPA audit. This was done mainly due to OH&S legislation requirements and also had the added bonus of complying with WorkCover and EPA requirements.

The upgrading of a dedicated machinery washdown bay was another issue the club was already aware of prior to the assessment as it was an agenda item I had brought up at committee level after attending the Australian Turfgrass Conference. It was then confirmed during the process of the EPA audit that there were changes that needed to be implemented to the existing washdown bay to make it compliant. EPA and local council officers were extremely helpful in providing relevant information on what was required to bring the facility up to standard.

The EPA audit highlighted the need for a more secure and safer fuel and oil storage facility as our current facility, like many country golf courses, would have been originally installed in the 1960-70's when storage regulations were either non-existent or very basic.

At present, the club has placed all of its oil storage containers on Australian Standard approved spill containment pallets and smaller drums are in a contained area. Waste oil is now stored in a lockable facility and drums are on spill containment pallets. The club now only stores 400l of waste oil at any one time. The club has a registered waste oil contractor who collects the oil on a regular basis.

At present the club has on its Capital ▶



"The assessment has helped Nowra Golf Club to become compliant but, it does take a long time, longer than expected" – *Bryce Russell, Nowra*

Nowra's environmental management plan and environmental policy have now been completed

Works Program to upgrade its bulk fuel storage facilities early in 2006. A Convault fuel storage system has been chosen.

In September this year the entire 45-hole complex was converted to a Toro Ozmac irrigation system. The previous control systems were 1970's electro-mechanical controllers with very limited programming capacity and in 1992 the club introduced a Micro Master 5000 system (Dos version) which was installed to the top 27 holes. Findings from the EPA audit and previous years of drought and low irrigation allocations were deciding factors to upgrade the system which will give the club more control of its water use.

Has the environmental assessment process provided increased awareness by your board and members generally?

The assessment has definitely increased the awareness among the club's management and directors and also the golf course and maintenance staff that are dealing with many of these issues on a daily basis. The club also informs its members and other club staff through media such as a superintendent's monthly report, member newsletters and staff newsletters. At board level there has been an extremely positive approach and I believe this is why so many projects have been carried out in the past 18 months.

What environmental achievements have been completed to date and which are still in the planning process?

The following have been completed;

- Upgrading of all course chemical storage facilities and filling stations;
- Upgrading of machinery washdown bay facility;
- Upgrading of irrigation control system;
- Couchgrass conversion on fairways, intermediate rough, tees and green surrounds. (Executive nine fairways to be converted Nov 2006),
- Implementation of wildlife corridors on Murray Course;
- Upgrading of oil storage facilities. At this stage the fuel storage areas will be completed in early 2006.

Comment on any benefits to your management operation that have flowed on by achieving compliance or improving in environmental performance.

Fuel, labour and machinery maintenance has been reduced due to the introduction of no-mow wildlife corridors on the Murray Course. Higher safety benefits for course groundstaff with the implementation of compliant chemical storage and filling stations.

There is a much greater awareness of the club's environmental responsibilities by directors, management and staff, while there is a wider awareness of the need for funding to further upgrade club facilities.

Have council/EPA environmental officers assisted in your programs?

Bob Parr from the Corowa Shire Council has been extremely helpful with assistance in lodging approvals for washdown bay facilities, fuel storage upgrades and tree removal and pruning submissions.

Peter Brown, who carried out the assessments, was a great help in understanding what facilities currently existed at the club and gave some good advice on how to go about implementing changes and using the audit report to upgrade existing facilities to make them compliant with current legislation.

Did you attend the full-day superintendent's workshop? If yes, please comment on its value in assisting you to achieve environmental goals.

There were no full-day superintendent workshops held in our area. The only type of information came from the AGCSA conferences, which were very enlightening and I believe started the process of addressing such issues at committee and board level by superintendents.

Please comment on any other aspects relevant to your experience in improving environmental performance.

When the club was first contacted by the EPA to take part in the trial audit, I put this to the committee as an agenda item.

There was a great deal of debate on whether or not to take part in the trial due to concerns being raised about our aging facility, funding for upgrade programs and the timeframe the EPA might give to carry out such works. It was decided by the Board, management and myself to take part in the trial and I believe that Yarrawonga was the only club in our area to do so. Looking back, I believe this has been a great move and the club has benefited immensely from the experience. It has been a great experience for myself and the staff as a great deal of the works carried out have been done in-house.

CASE STUDY TWO: NOWRA GOLF CLUB

Superintendent: Bryce Russell

Nowra Golf Club is situated on narrow alluvial sand flats between the Shoalhaven River and a sandstone escarpment that features rainforest flora. Urban development dominates the top of the escarpment and much of this is drained to the river via the golf course. The course is elevated only a few metres above the high tide mark and a tidal pond on the 18th drains much of the urban run-off.

The maintenance facility is tucked up on the rising ground under the cliffs of the escarpment. As such, there is little room to expand the facility and upgrading will require good design. The course is reliant on town water for irrigation. The club, which has a maintenance crew of five full-time and one part-time staff, has 700 members and attracts 50,000 rounds of golf per year.

What environmental policies, practices or achievements were in place prior to the environmental assessment process? Were there any written policies or management plans in place?

There were no written policies or plans in place prior to the assessment, however, we did have policies that were verbal. For example, all machinery must be washed down on grassed areas, while rinsate from pesticide drums was to be used in the spray solution. All employees were expected to know these policies but there were no documents such as an EMP that could be used by employees as a reference guide.

List and comment on the areas that needed improvement or compliance that were highlighted in the environmental assessment. Had you recognised these issues previously?

The areas required for us to improve and comply with legislation were vast and many. The main issues we needed to address included:

- Form an EMP and environmental policy;
- Obtain a copy of the NSW Pesticides Act and display it;
- Calibrate spray equipment every six months. We did this already but we needed to document the process and the results;
- Totally change the way we store pesticides. We had spill trays under pesticide containers but had no bunding. It was also too close to a work area and was so small it didn't allow us to store items correctly, e.g. powders were not stored above liquids;
- Provide spill kits, establish spill response procedures and practice the procedures;
- Provide bunding in the shed;
- Provide for a separate designed pesticide preparation/washdown area;
- Bund and cover recycled oil drums;

'An on-going environmental management action plan keeps issues on the agenda and therefore provides greater confidence and peace of mind that sound practices are in place' – *Rod Waite, Easts Leisure and Golf*

- Provide bunding (and preferably a roof) to fuel storage tanks and fuelling areas;
- Provide a separately designed machinery washdown bay;
- Construct soil bins to contain stockpiles of soil, gravel and mulch;
- Somehow determine how to improve the water quality and appearance of the pond on the 18th hole.

I recognised these issues prior to the assessment therefore there were no great surprises. Some of these issues were raised many years ago but were not acted upon then. This is why the assessment helped me a great deal as it provided an independent viewpoint that the Board looked favourably upon and consequently acted upon the recommendations. I must point out, however, that it was not this Board that I raised the issues with previously.

The assessment has helped Nowra Golf Club to become compliant but it does take a long time, longer than expected. There are still issues that we haven't resolved yet but the wheels are in motion.

Has the environmental assessment process provided increased awareness by your Board and members generally?

This Board has been very proactive trying to rectify areas of non-compliance. I have no complaints at all. Most of the Board work full-time with their businesses and still found time to work on resolving these environmental issues.

A special mention must go to our vice-president (who is an environmental engineer) for his time designing new facilities, dealing with council and assisting with grant applications.

As for the club's members, they have been notified of the club's intentions to proceed with new facilities that will make us compliant. I haven't heard any negative feedback from the membership.

What environmental achievements have been completed to date? Which are still in the planning/budget stage?

The environmental management plan has been completed and so too has the club's environmental policy. The DEC has looked favourably over the EMP, which is encouraging. The documents have also been approved by the Board and so are ready to be put into full operation.

A copy of the NSW Pesticide Act has been obtained and now resides on display in the shed. Spray equipment calibration documents have been established and a review term of six months set. This policy now exists in the EMP. Bunding has been provided in the shed and our stockpile area has been totally enclosed with concrete blocks.

Some issues have been resolved partially and hence temporarily until some new facilities are constructed. This includes bunding of our pesticide storage area and diesel storage tank. By far our biggest improvement will occur when our new facilities are constructed. These new facilities will contain a separate:

- Machinery washdown bay;
- Pesticide preparation/washdown area. Also included in this area is an emergency shower, preparation bench and pesticide storage;
- Fuel and oil storage and refuelling zone.

All the above will be bunded, roofed and wastewater will be treated.

We also applied for a grant to improve the water quality in our 18th pond. Unfortunately, if the club does not receive this grant the club does not have the funds to do it themselves

and will have to re-apply in the future and hope for a change in fortune.

Comment on any benefits to your management operation that have flowed on from achieving compliance or improvement in environmental performance.

I think it's too soon to know exactly what the benefits are to our management operations. However, I can foresee some of the benefits already, such as being more organised, better prepared for emergencies, the importance of documentation and being more aware of the effects our daily practices have on the environment and the actions we need to undertake to minimise or prevent our environmental footprint.

Did you attend the full-day superintendent's workshop? If yes, please comment on its value in assisting you to achieve environmental goals.

I did attend the workshop and I found it useful for providing a lot of extra information on stormwater pollution, washdown bays, bunding etc. I also found it useful for informing attendees where to access relevant legislation and how to complete and document risk assessments.

Have council/EPA environmental officers assisted you in your programs?

I met with environmental officers just after the assessment and they offered us assistance when required.

Please comment on any other aspects relevant to your experience in improving environmental performance.

It is worth noting that some veteran members of the club formed a Landcare group 10 years ago with the vision of removing noxious and undesirable plant species from the surrounding riverbank and bushland. Replanting with endemic plant species then followed the clearing process. Lantana was by far the biggest problem and to see their achievements today is astonishing.

Over the years some key personnel of the group have sadly passed away, but a few others have volunteered to take up where they left off and are a regular Monday morning sight. The club is very appreciative of their efforts which have not only enhanced the golfing experience, but has benefited the entire local ecosystem. Their achievements could certainly not have been matched by the club's employees.

CASE STUDY THREE: EASTS LEISURE AND GOLF CLUB

Superintendent: Rod Waite

In 2003, Maitland Golf Club amalgamated with East Maitland Bowling Club to trade as Easts Leisure and Golf. A new clubhouse was constructed and the golf club transferred into the new premises in 2004. The course consists of 18 holes and is maintained by six full-time staff. The course is on gently sloping land consisting of clay soil above Whites Creek that is subject to extensive urban run-off. Mature eucalyptus and melaleuca trees are scattered throughout.

What environmental policies, practices or achievements were in place prior to the environmental assessment process? Were there any written policies or management plans in place?

An extensive tree-planting program has been in place over the past 15 years with some of the ▶

work conducted in conjunction with Maitland City Council and the National Heritage Trust. Bird boxes have been erected and areas once maintained have been returned to native bushland habitats. In 2003 a disused paddock (regularly flooded by Whites Creek) adjacent to the 12th fairway was formed into wetlands and planted out with 1000 native species in conjunction with Green Corp.

An environmental management plan document was lost during the transfer from the old to the new club premises. Although this management plan existed, it was not readily referred to.

Although we were not compliant in a number of areas, we paid particular attention to environmental practices in water management, pesticide handling and application, waste management, fertiliser and soil management practices, native vegetation, fauna and wetlands management.

List and comment on the areas that needed improvement or compliance that were highlighted in the environmental assessment. Had you recognised these issues previously?

The areas that we identified compliance shortfalls were machinery washdown, chemical storage, fuel storage and handling. Practices and structures were in place some time ago to minimise pollution but they did not comply with current standards.

Has the environmental assessment process provided increased awareness by your Board and members generally?

The environmental assessment made the club, and especially the golf course committee, aware of their environmental responsibilities. When the assessment was submitted to the committee, it was clear to see that the club was compliant in most areas but there were a few areas that needed immediate attention.

Unfortunately the non-compliant areas cost the most to rectify. The committee recognised this and used the assessment to evaluate the areas of highest environmental risk. Once prioritised, measures were put in place to overcome the risks.

The assessment also made the committee aware of the possibility of prosecution in the event that an environmental incident should occur and efforts should be made to prevent any such event. They also understand that they must be active in their environmental responsibilities without procrastination and to show environmental due diligence.

What environmental achievements have been completed to date? Which are still in the planning/budget stage?

Since our assessment the club has been active to meet our objectives. Environmental achievements to date include:

- A fully-bunded chemical storage container has been purchased;
- The E-Par Environmental Management program has been purchased;
- Consultants have been sourced and quotes obtained for a machinery washdown and pesticide load-up facility. The committee has approved a design and quote. Expenditure has been approved and work will commence shortly. Currently the club is at the planning and development stage;
- Oil and pesticide spill kits have been purchased and staff trained in their use;
- An oil storage bund has been constructed to contain all 20l drums. This area is locked;
- A back-flow prevention device has been installed to protect town supply to the maintenance shed; and
- Environmental committee meetings have been held to inform the golf course committee and the Board of the bowling club to make them aware of the present situation.

Comment on any benefits to your management operation that have flowed on from achieving compliance or improvement in environmental performance.

The major benefit is having an on-going environmental management action plan that keeps issues on the agenda and therefore provides greater confidence and peace of mind that sound practices are in place. The flow-on benefits will be in safer and more efficient course operation when all the compliant structures are in place.

Have council/EPA environmental officers assisted you in your programs?

Meetings have been held with local council environmental officers to assist with assessment and implementation of the measures.

Did you attend the full-day superintendent's workshop? If yes, please comment on its value in assisting you to achieve environmental goals.

Attending the superintendent environmental workshop made me aware of the situation and of the responsibility of superintendents in their environmental stewardship. It motivated me and my colleagues to do better and strive for excellence.

By becoming involved it has been educational and experience has been gained. It has lifted our environmental performance. Staff members have become more environmentally aware owing to the processes described above and this is reflected in positive attitudes in day-to-day work practices.

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Inside The Open Championship - St Andrews 2005

In July, The Open Championships returned to the home of golf, the Old Course at St Andrews. The unique links land of The Royal and Ancient has long been a Mecca for agronomic connoisseurs and here ATM gets a rare insight into preparing the hallowed turf for one of golf's most prestigious Majors. Former AGCSA Graduate of the Year winner James Dalton, who spent the year leading up to The Open working at St Andrews, joins with STRI tournament agronomist Alistair Beggs and AGCSATech manager John Neylan to take a behind-the-scenes look at the 27th staging of The Open at the world's most iconic golf course.

The great Arnold Palmer once said that playing golf on the Old Course at St Andrews was playing the game 'in its purest form' and 'seemingly untouched by time'. Those comments echo true from a turf management perspective as well, with the Old Course representing a link to the past where some of the practices that have been central to the upkeep of the unique links are still upheld today.

The Old Course has witnessed some of the great moments in golf and some of its more infamous. It has chewed up and spat out many a championship pretender, while for those who have conquered its undulating terrain, like Australian Peter Thomson did when he collected his second Open in 1955, they rate it as among the most rewarding of victories.

Just as the Old Course is on any serious golfer's must-play list at least once in their life, an opportunity to work on the St Andrews maintenance crew is the sort of once-in-a-lifetime chance that any greenkeeper worth his ilk would jump at.

Such a chance was afforded to aspiring superintendent James Dalton, winner of the 2003 AGCSA Graduate of the Year, who spent a year in the lead-up to the 2005 Open working under Links superintendent Gordon Moir.

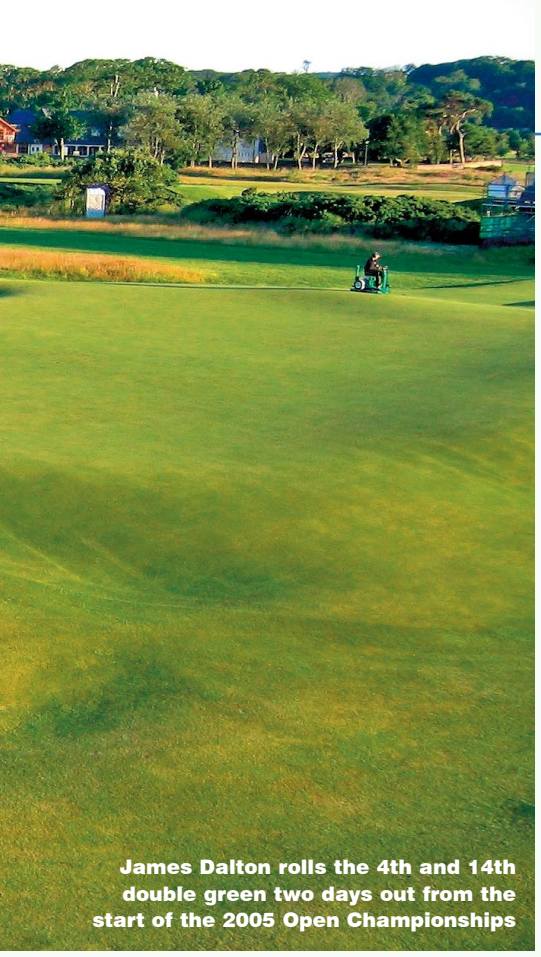
In this feature, Dalton recounts his time at St Andrews with special focus on preparations for the 2005 Open. Following Dalton's account, Alistair Beggs, northern area manager and R&A agronomist from the Sports Turf Research Institute in the UK outlines the role the organisation plays in Open preparations and looks at some of the other venues on The Open rota. AGCSATech manager John Neylan, who visited St Andrews following the ITC conference in Wales, concludes the article by examining some of the finer techniques employed in course presentation during The Open and looks at whether similar practices could be adopted in Australia.

FROM THE SHED

JAMES DALTON

Having always been taught if something is worth doing, then it is worth doing well, I felt what bigger challenge could there be in tournament preparation than working The Open Championship at St Andrews.

It was quite unbelievable to arrive in St



James Dalton rolls the 4th and 14th double green two days out from the start of the 2005 Open Championships

BY JAMES DALTON, ALISTAIR BEGGS AND JOHN NEYLAN

Andrews and view the course with my own eyes for the first time. Having seen pictures all my life through television and greenkeeping magazines, I found there were times when working I had to pinch myself when looking back at 'The Auld Grey Toon' and realising my dreams had become a reality.

The entire Links property is situated right on the North Sea with the town of St Andrews overlooking six courses – The Old, New (1895), Jubilee (1897), Eden (1914), Strathtyrum and Balgove (both 1993) – as if guarding the precious land with its life. The complex is under the auspices of superintendent Gordon Moir and to cater for the locals and visitors from all over the world, a seventh course is now being constructed on the outskirts of town. Allan Patterson has been employed as superintendent.

Turf species on the Links include a range of fescues, bents and other cool-season grasses that are native to the area. The turf, when dried out in summer, provides a firm, hard and fast surface which is a key element of links golf where a little bit of luck can go a long way. The land is made up of rolling mounds and undulations that have been forged out of sand dunes over many centuries of unforgiving weather conditions.

The courses, which stretch over 660 acres (267 hectares) of Links land, play tight and are all laid out extremely close together with only the width of a path separating each course.

THE OLD COURSE

My first placement at St Andrews was working on the Old Course under head greenkeeper Euan Grant. 'Gowf' has been played on this unique track of land for over 600 years and the double greens and fairways are a marvel.

Arriving in the middle of winter was also some experience and one that I was not prepared for. Single-figure temperatures were accompanied by icy blasts off the North Sea, meaning turf growth was at a minimum.

From when I arrived in December through to April the fairway mowers did not leave the sheds. Greens would be cut, at most, twice a week with clippings barely filling the box. Due to this slow growth and poor recovery from divots, golfers are made to hit off small synthetic mats to protect the fairways over winter. During the golfing season staff are employed to hand-fill divots over the entire links, alternating between courses each day.

The minimal growth over winter meant that there was plenty of time for construction work. Ninety-four of the 112 bunkers on the Old Course were reconstructed over this time in preparation for The Open.

I was lucky enough to be involved in this work and got to experience first-hand how revetted bunkers are constructed. It really is an art form and the skills used have been passed down over decades from greenkeeper to greenkeeper.

Sod used to build these bunkers is taken from the Links' massive 12-hectare fescue nursery. Bunker bases were shaped and fresh sand added which is simply sourced from the beach. The sand is sieved twice to remove any rock or shell.

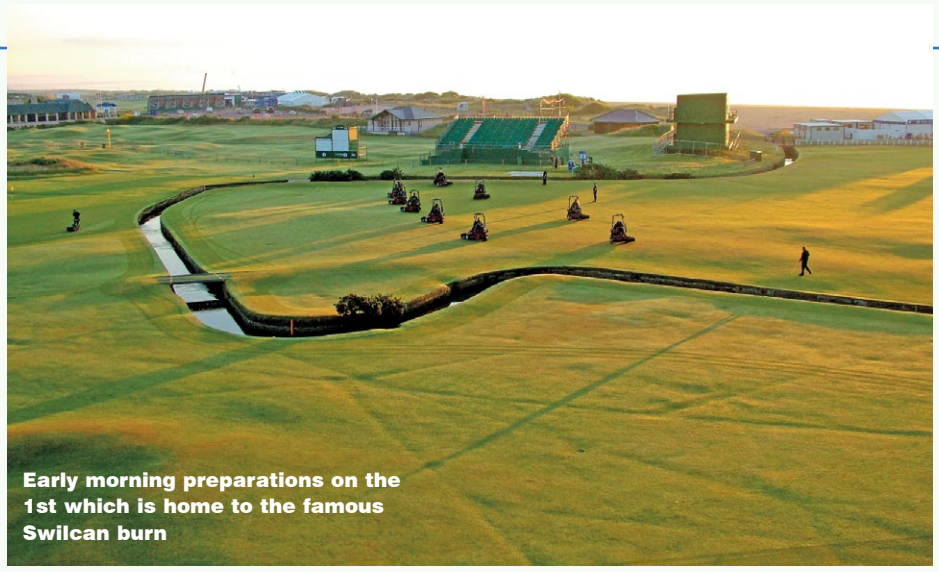
Other works that were undertaken before the season began in April included the reconstruction of tees and the maintenance and management of the extremely penalising gorse bushes that line the fairways.

Playing golf on the Old Course is open to anybody as long as you hold a handicap below 24. Demand to play is extremely high and to obtain a tee time on the Old Course you must fill out a ballot card the day before you wish to play and hope that your name gets drawn out.

The Old Course is closed every Sunday, ▶

which has been a tradition for as long as anyone can remember. The reason for this is that women are said to have done their washing on Sundays in the Swilcan Burn that runs across the 1st and 18th holes. Nowadays, this provides greens staff with perfect conditions to get some uninterrupted work done including hydrojecting, dusting and spraying which on a normal day can hold up a golfer's round.

With the Links being Crown land, members of the public are free to walk with their pets wherever they please on the Old Course on Sundays which some may find surprising considering the high stature of the course.



Early morning preparations on the 1st which is home to the famous Swilcan burn

THE NEW COURSE

My second placement was on the New Course. While The New is relatively new compared to the Old it is still some 110 years old. Laid out by the famous Old Tom Morris, the New often plays second fiddle to its famous sibling whereas in reality it is arguably a stronger course in terms of challenge, layout and pure links golf holes.

Working under the guidance of head greenkeeper Gordon Mckie, my placement began in April and spring was in the air with growth increasing. Seasonal staff are taken on for this busy six-month period and are usually from all over the world. I was fortunate to work with Americans, Irish, English, Argentineans, Icelandics, Estonians, Scots of course and another Australian, Mike Love from Royal Melbourne. It was wonderful to meet and work with greenkeepers from different parts of the world and to learn about their different turf management techniques.

The majority of my time on the New was spent trying to keep up with the rapid spring growth. The mild temperatures of around 17 degrees Celsius in spring seemed to be the perfect climate for fescue as it thrived with a minimum of fertiliser and irrigation.

All turf surfaces were cut regularly with a huge amount of time spent on getting green speeds to an acceptable level. This was something I found different to Australian greenkeeping where day-to-day green speeds are not always an issue, whereas on the New it was regularly monitored and adjusted.

Greens are cut every day in the growing season and rolled on average four times a week with dethatching and dusting occurring every three weeks. Hydrojects are used once a month to aerate the soil profile.

THE OPEN CHAMPIONSHIP

Without doubt, The Open Championship was the highlight of my year. The build-up was such a buzz. From the day I arrived in December 2004 the subject of The Open would be brought up at least once a day. The days remaining until the beginning of Open week were written on the work board every morning starting at "167 days to go". As each day was crossed off the excitement and anticipation would increase.

I don't think the weather could have been any kinder for The Open from a greenkeeping point of view. We received a nice amount of rainfall one to two weeks out from the tournament before drier, warmer conditions arrived where temperatures reached 24 degrees Celsius.

The Royal and Ancient Golf Club of St Andrews requested green speeds of 10.5 on the stimpmeter and that's exactly what they got. Some may say this would be a bit slow for a major championship, but at St Andrews one has to be wary of the wind speeds that can cause havoc with the pace of the greens.

A spectacular aerial view of the St Andrews Links. The Jubilee Course is nearest the coast while the Old Course is sandwiched in between the New and Eden courses

Leading up to The Open Championship turf surfaces were cut regularly with fairways and greens everyday. It was amazing to see 12 Toro triplexes winding their way up a fairway one after the other in synchronised fashion cutting the turf at a hard and fast 8mm.

It was hard not to feel sorry for the greens cutters as they embarked on their daily duties. Imagine pedestrian cutting at 5mm on dry, hungry fescue in dull conditions on double greens that can reach 70 metres across. The 5th and 13th double green is one of the biggest greens in the world measuring 3800m^2 in area and could take one hand cutter 1.5 hours to mow, walking an estimated four miles!

Staff began the day at 4am and worked through until 9am before clocking back on at 6pm and finishing as late as 11pm; long days and early starts, but all definitely worthwhile.

My particular tasks for The Open varied. The majority of the time I was part of the bunker squad that was responsible for the presentation of the Old Course's famous hazards.

I have never been involved in a task that required such attention to detail. Perfection was the level we were expected to reach when raking bunkers. Time would be spent shaping the bases, removing debris and then pattern teeth raking to achieve the desired result.

Members of the R&A Rules Committee would follow behind and if the standard was unacceptable then we would have to re-rake the bunker until a satisfactory result was achieved. Raking bunkers two or three times was not uncommon. The two bunkers that occupy the largest area – Hell and Shell – took three staff up to one hour to groom.

Another task I had was to roll greens, usually in the evening. This was a job I thoroughly enjoyed as it reminded me of my apprenticeship days at the Ocean Grove Bowling Club. At the beginning of Open week, rolling would be carried out twice a day, but this task ceased when green speeds reached 10.5 and then only cutting was required to keep them at that speed.

My final task was to hand water greens in the evening if rolling wasn't required. Just a light syringe was applied and an extra pass across some of the higher areas to maintain a small amount of moisture.

The Open Championship of 2005 was well received by players and media. Unfortunately the weather was very calm. It would have been interesting to see how the players would have handled the conditions if the wind had really picked up as I had seen it do on occasions throughout the year.

BACK HOME

As I write this, the Dunhill Links Championship is being held at St Andrews, Kingsbarns and Carnoustie which signals the end of the golfing season in Scotland. I was originally meant to finish my placement at the end of this tournament but due to a promotion back home to assistant superintendent at Thirteenth Beach Golf Links in Victoria, I decided the time was right to return home.

I sometimes find it hard to believe that I was actually over the other side of the world working as a greenkeeper at St Andrews where the game of golf evolved. It is a place where the spirit and traditions of the game have been safeguarded for over six centuries and for a greenkeeper an unsurpassed Mecca.

FROM THE GRASS ROOTS

ALISTAIR BEGGS

The Board of Greenkeeping Research (as it was called in those days) was founded by The Royal and Ancient Golf Club and The Home Unions in 1929. Since then and through a change of name to the Sports Turf Research Institute (STRI) in 1951, the relationship between The R&A and STRI has been a strong one.

Today the STRI acts as official agronomists to the championship committee of The R&A and in this capacity the STRI specialist agronomy team visits all nine Open venues twice a year every year and the four final qualifiers twice per year when the associated Open venue comes onto the rota (usually four years in advance of a Championship). We also visit all the regional qualifiers once a year.

In addition to the above work program, the duty championship agronomist attends preparation meetings in advance of The Open and is present throughout the week itself to offer support and guidance to the greenkeeping team.

AGRONOMIC OBJECTIVES

The Open Championship has a history of being played on links sites. The current rota includes venues such as Royal St Georges, Royal Liverpool, Royal Birkdale and Royal Lytham St Annes in England and the Old Course, Muirfield, Carnoustie, Turnberry and Royal Troon in Scotland.

The ages of the venues vary enormously. Golf has been played in St Andrews for more than 250 years whereas Turnberry was developed into a championship venue by architect Mackenzie Ross after World War II.

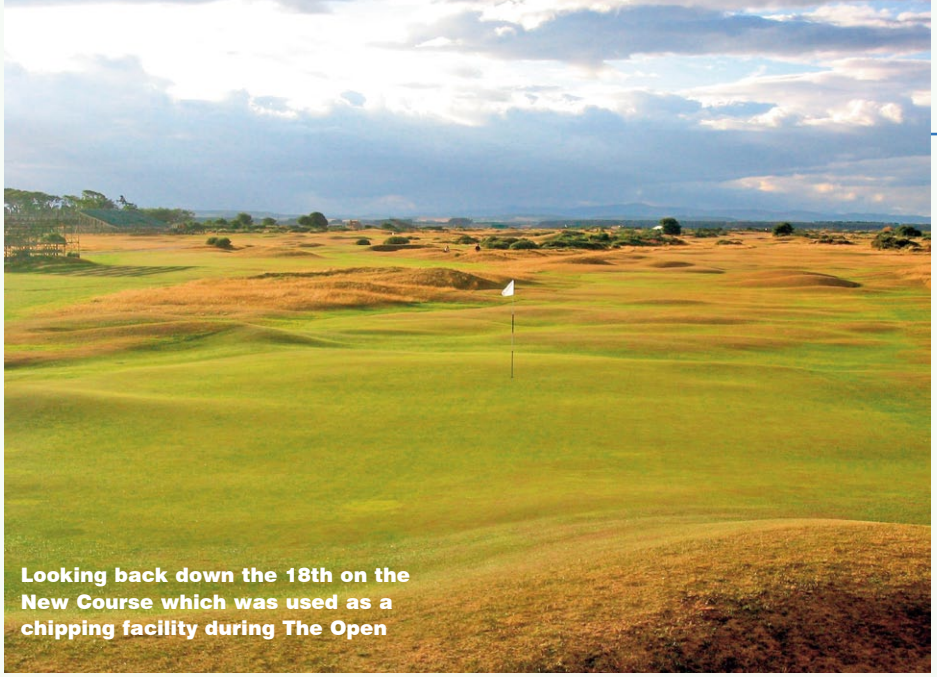
By their very nature they are all sand based and occupy fixed dune landscapes that are often open, windswept and barren. The grass swards that prevail on all the sites are a product of geographical location, environmental influences and the hand of man.

The east coast venues are generally drier as they receive lower levels of rainfall. The difference is quite dramatic with some eastern sites receiving around 23mm per annum compared with 40-45mm on the west coast.

The drier climate favours the fescue grasses (*Festuca spp*) and the better greens on some sites may have upwards of 75 per cent colonisation by this grass. Fescue is a low maintenance drought-tolerant grass type which naturally provides good pace without having to resort to absurdly low mowing heights. It is also largely free from major disease problems in our climate.

The other main grass components of greens include browntop bentgrasses (*Agrostis tenuis*), and annual meadow grass (*Poa annua*). The former grass type is commonly found and co-habits with fescues very well. It is favoured and encouraged particularly on western links sites where it tends to be prevalent.

The latter species is considered a weed grass and is generally discouraged. However, there is an acceptance that its lifecycle and adaptability to the golf green environment leads to some presence. However, a preponderance of more favourable grass types and the timing of The Open Championship allow this species to be discouraged through ▶



Looking back down the 18th on the New Course which was used as a chipping facility during The Open

appropriate management. There are other contaminants too. Yorkshire Fog (*Holcus spp*) is a prostrate colony-forming coarse leaved grass and there is even some perennial ryegrass in selected greens.

Management programs at most of the sites revolve around the promotion of browntop bents and fescues and the discouragement of annual meadow grass. In general terms this means limited nutritional inputs, plentiful aeration and topdressing and a policy of keeping the surfaces dry and firm. This approach tends to favour the grass types we wish to encourage. It also complements the current strategy of The R&A Golf Course Committee, which is encouraging clubs to manage in a sustainable manner. More information is available through the website www.bestcourseforgolf.org.

The STRI's role does not stop with agronomy. Attention is constantly being paid to rough management, habitat development and biodiversity in tandem with The R&A's commitment to environmental management.

STRI ecologist Bob Taylor carries out a pre and post Open inspection at all host venues and constantly liaises with statutory bodies to ensure that the staging of The Championship has positive rather than negative impacts on ecologically sensitive areas. After The Open, all parties work to complete renovation while maximising ecological development.

THE 2005 CHAMPIONSHIP

In July 2005, The Open Championship returned to the Old Course at St Andrews. While the Old Course has been shaped by nature, it would be false to say man had no influence over its evolution. For instance, in 1764 the number of holes was reduced from 22 to 18 and in 1864 Tom Morris (on his return from Prestwick) widened the fairways and greens.

In fact, Tom Morris played the most significant role in shaping the Old Course into what we see today. As four-times Open champion himself, he was obviously a very capable golfer. He quickly learned the fine bent and fescue grasses produced the best turf surfaces for golf. To retain these grasses he kept fertiliser and water application to a minimum and implemented regular deep aeration and sand topdressing.

These basic principles of turf management continue to underpin the course management program adopted by the current head greenkeeper Euan Grant. Pesticide and fertiliser application is minimal with only 20-25 kg/ha of nitrogen being applied to the greens on an annual basis. Irrigation is only used to keep the turf alive.

Deep aeration is carried out regularly, using the vertidrain during autumn/winter and the hydroject through spring and summer. Mowing heights are kept at approximately 5mm with surface refinement operations including light topdressing, rolling and occasional verticutting being achieved regularly to provide smooth surfaces. Appropriate pace is generated due to the fine texture of the turf and firm underfoot conditions.

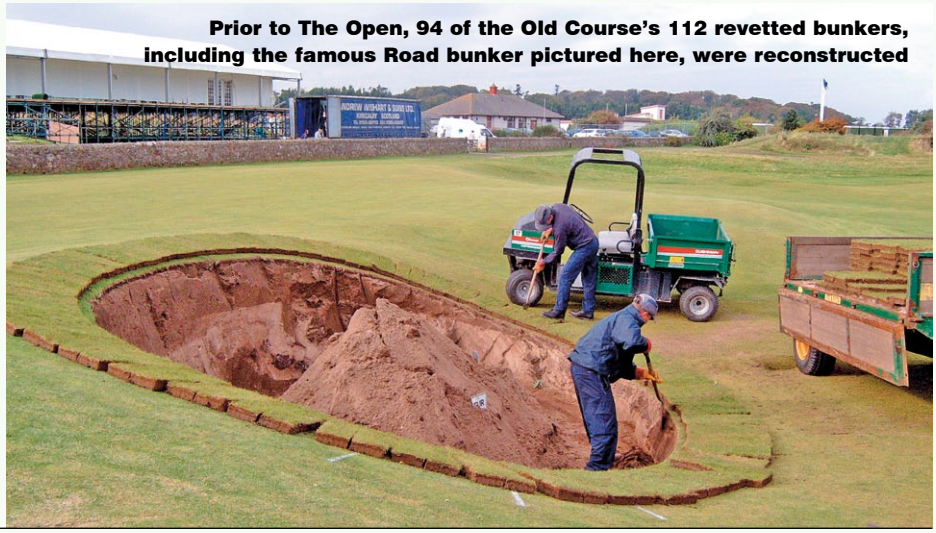
The only aspect of maintenance that has changed over the years is the quality of machinery used to implement the various operations and the frequency in which they are conducted. All course management practices are undertaken with respect for the environment and knowledge of the importance it plays in the challenge that is The Open Championship.

In general terms, the championship committee of The R&A will seek green speeds in the region of 10.5 feet for The Open. Any faster than this and there is a chance of windy weather making a nonsense of The Championship.

At some venues achieving these speeds is easier than it is at others. With fescues prevalent on the Old Course (for more information see the case study at www.bestcourseforgolf.org) a mowing height of 4.75 mm provided the desired results. Further mowing frequencies were reduced from those planned to prevent the greens from becoming too fast. For example, the 11th green was not mown on Friday evening while none of the greens were cut on the Saturday night.

The fairways across the Old Course are superb examples of links surfaces. They are firm underfoot and support an excellent fine and wiry texture. Regular sanding and verticutting is implemented to retain such surfaces.

As growth rates are so slow, the recovery from divot damage is slow. To help increase the rate of recovery across popular landing zones, old divots are replaced with fresh patches of turf rather than the usual soil and seed. It is not unusual for the groundstaff to patch as many as 10,000 divots over the winter months!



Prior to The Open, 94 of the Old Course's 112 revetted bunkers, including the famous Road bunker pictured here, were reconstructed

During The Championship this year fairways were mown with Toro greens mowers at a height of 8mm. Interestingly the 9th fairway was offering similar stimpmeter readings to the greens on the Sunday morning!

For the 2005 Open, 94 of the 112 bunkers across the Old Course were revetted. The revetting included famous bunkers such as Shell (7th hole), Strath (11th) and, of course, the Road bunker on the 17th, which was changed slightly to increase its gathering effect.

Twelve thousand square metres of turf was used in this operation, with the Shell bunker using up more than 10,000 turves! The construction of these bunkers is a fine art and the way in which they are built is a closely guarded secret. If you are lucky enough to be told how it is done by the groundstaff, expect to be shot soon afterwards!

MEETING MODERN-DAY DEMANDS

Technological advances with ball and club meant that further changes were made to the course in advance of the 2005 Championship. The tees on 2, 4, 12, 13 and 14 were extended backwards, increasing the length of the Old Course by 164 yards. It now measures 7,279 yards (par 72) from the championship tees, with the 14th being the longest hole on The Open rota (618 yards). As the existing hazards cannot be moved, it was necessary to move these tees further back, thus bringing the likes of Cheape's bunker on the 2nd and the Beardies on the 14th back into play.

Links superintendent Gordon Moir (left) and Allan Patterson

This is a theme played out at many of the venues. Many of the pros who returned to Royal St Georges in 2003 found a number of changes including a new 14th green beyond the old position and tucked further in against the out of bounds fence. Additional bunkers were sited on holes like the 13th to challenge the longer hitters, and nine new championship tees were constructed at the 2nd, 4th, 6th, 8th, 10th, 11th, 12th, 13th and 15th holes. This represented an increase in length of 246 yards since the 1993 Championship and a total length of 7106 yards.

The story was similar at Royal Troon in 2004. New tees were introduced at the 1st, 6th, 11th and 15th holes as part of a joint agreement between the club, The R&A and golf course architect Donald Steel. Not only did these tees mean that the length of the course was extended to 7,175 yards (par 71) but in the case of the 1st and 15th the line of play was also markedly altered. The new tee at the 1st is a particularly exciting addition.

The position of bunkers was also reviewed and a total of 10 new hazards were introduced at the 1st, 2nd, 4th, 7th and 16th holes making a grand total of 93 on the course. Forty eight bunkers were revetted and renovated in the winter prior to The Open.

Probably the most changed venue is Royal Liverpool (Hoylake) which will host its first Open Championship for 39 years in 2006. The course will extend beyond 7200 yards and has had three new greens built along with a host of new tees and bunkers. Preparations are already well underway and being a member of the club I can't wait to see the return of one of golf's most prestigious tournaments.

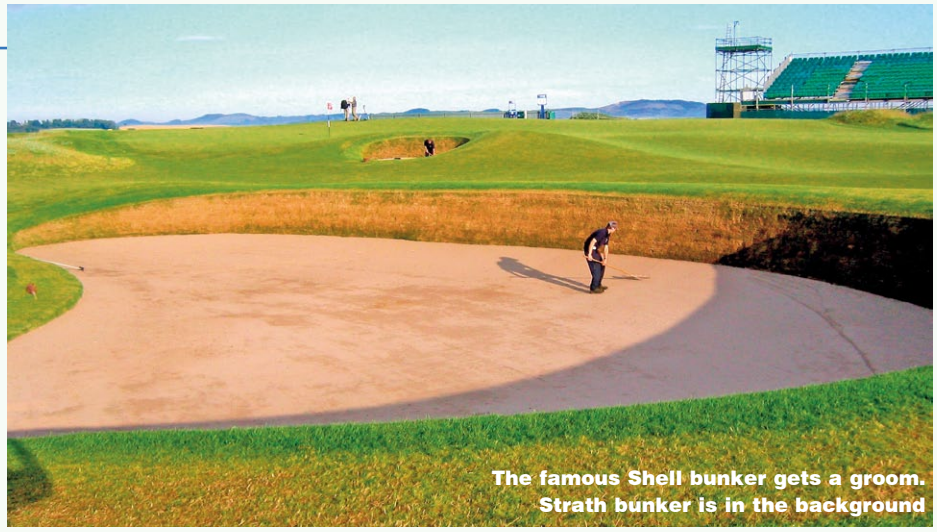
FROM THE GALLERY

JOHN NEYLAN

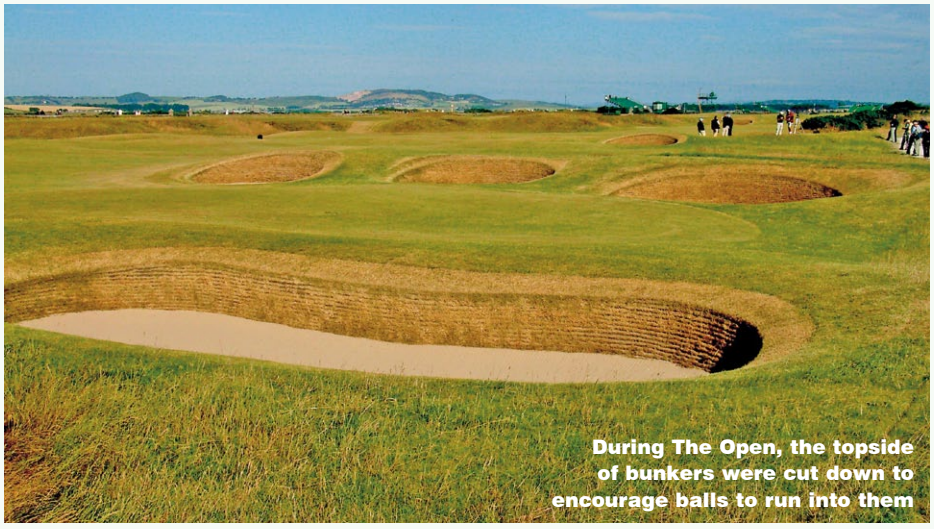
To have the opportunity to attend the 2005 Open at the home of golf was a great privilege and a terrific opportunity to observe a links course prepared for such a prestigious event. I was fortunate to inspect the course in January 2003 when it had its winter coat on and to see it in mid-summer and prepared for a tournament was quite a contrast.

My particular interest was to look at the grasses and how the golf course was prepared for the tournament and how this compares to the course set up for the Australian Open. With the Australian Open having just been played at Moonah Links this year, it was particularly pertinent as we would consider Moonah Links and the Mornington Peninsula courses as links-style courses. Some of the general observations I noted included;

- The grass rough was not as severe as I thought it might have been. It was moderately tall and wispy but not necessarily dense. The rough intruded well into the fairways onto fairway mounds making them relatively narrow in key areas.
- Gorse is a feature of the course and highly penalising to an errant shot. Listening to the BBC, the commentators were most concerned about the physical pain that Tiger Woods would experience as he gingerly plucked his ball from the gorse following a wayward shot.
- The fairways were very fine, dense and provided a tight lie. It is very much a product of the fine fescue and bentgrass that makes up the turf in the fairways.
- Firm and dry appeared to be the formulae for setting up the golf course as it dried out progressively over the last two days. The fairways were very dry and hard and the ball often responded by bouncing at an obtuse angle depending on which fairway contour it struck. The bonus was plenty of ball run and with the incredibly fine surface it was not uncommon to see a player putting along the fairway when in putting range.
- The surrounds of the greens were cut down hard and the ball fed off them as a result. There were few shots that didn't run away if the ball ran through the green and trickled onto the surrounds.
- The topside of the bunkers were cut down to encourage balls to run into the bunkers.
- The greens were dry and firm, however, they did not appear to be excessively quick.
- The pin placements, particularly on the Sunday, appeared to be very challenging. They were tucked into interesting corners, on edges of greens and near tricky little ridges. The pace of the greens was reasonable given the pin placements.
- The wind was up a bit on the Saturday and certainly influenced the golf, however, it is not hard to imagine how tricky the course would become if it was seriously blowing.



The famous Shell bunker gets a groom. Strath bunker is in the background



During The Open, the topside of bunkers were cut down to encourage balls to run into them

The Links greenkeeping contingent for the 2005 Open Championship

In observing the events at St. Andrews, I often looked at them in the context of the Australian Open at Moonah Links and whether the way the course was presented would be acceptable under Australian conditions.

While both courses are coastal they are different courses in different environments with different grasses, and many of the challenges presented at St. Andrews would make Moonah unplayable. It once again reinforces the notion that each course in its particular environment must be set up according to its strengths and weaknesses rather than trying to replicate the unique attributes of other courses.

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AGCSATech Update

BY JOHN NEYLAN

The Perennial Climate Control system which was used to assist in the preparation of the drop-in one-day cricket wicket at the Telstra Dome

In this latest instalment of AGCSATech Update, John Neylan looks at how new technology could be used to overcome some of the challenges faced in preparing the Telstra Dome surface and outlines the latest developments in AGCSATech's bentgrass trials.

CONTROLLED ENVIRONMENT AT TELSTRA DOME

Telstra Dome is arguably one of the most challenging sportsfield environments in the world. Shade is the most significant factor with a large section of the northern end of the stadium receiving very little natural light for several months each winter. The combination of low light and a high use schedule makes it difficult to maintain a high quality turf cover without investing in a program of regular turf replacement.

The management of Telstra Dome continues to invest in ongoing research and development to determine practical methods of modifying the environment to extend the life and improve the recovery potential of the turf. One such method has been the trialling of the Perennial Climate Control system.

Perennial Climate Control was founded by former New Zealand Cricket turf manager Mike Robins. Along with input from both New Zealand Cricket and Lincoln University, Perennial researches, designs and develops products to assist in the protection and growth of sports turf. Perennial's products have applications across a number of different sports with a particular focus on cricket as well as turf growth in shaded areas.

Perennial's primary product, the Perennial Climate Control, is designed specifically for the preparation of high quality cricket pitches and accurately controls:

- Solar radiation;
- Air temperature;
- Relative humidity;
- Precipitation;
- Air flow.

The first test for the equipment at Telstra Dome was on the drop-in wickets used for the Johnnie Walker Super Series which pitted Australia against the World IX in early October. The controlled atmosphere conditions allowed the match and practice wickets to be dried out evenly and assisted in preparing high quality playing surfaces.

How might this system be used in the future management of the Telstra Dome surface? The hope is that the Perennial Climate Control system could be used in high wear and shaded sections of the field such as the goal square and the centre corridor at the northern end to provide additional light and warmth to stimulate recovery and seed germination.

Fine fescue, used here at the new Magenta Shores development in NSW, provides an ideal contrast with couchgrass and bentgrass in Australian conditions

BENTGRASS TRIALS

Since 2000, AGCSATech has been collecting and evaluating bentgrasses from golf greens around Australia. Of the 450 individual plants collected, 100 were placed in a putting green trial at Chisholm TAFE in Rosebud (VIC) for on-going evaluation.

All the bentgrasses collected were assessed for seed head development, as this is an important attribute for seed production. However, several of the plants collected that had a very high density and turf quality produce very low numbers of seed heads.

The early improved bentgrass varieties were clonal selections from greens originally established to the South German mixed bentgrass. Cultivars such as Toronto, Cohansey, Washington, Arlington, Congressional and Old Orchard were established by vegetative propagation (Warnke, 2003) which was considered a standard method of bentgrass establishment until the 1950's when the first improved seeded cultivars were released.

Traditional turfgrass breeding can be at times a compromise between turf quality and density and producing commercial quantities of seed. Consequently, it may mean that some of the plants with the very best turf characteristics are either left out or play a minor role in the final multi-parent clone.

Because several of the AGCSATech collection fit into this category of excellent turf characteristics and low seed head production, it has been decided to undertake trials to examine the feasibility of vegetative propagation as a means of utilising these grasses.

Trials have been established to initially build up the amount of material for further trials in harvesting and large scale propagation. Twenty selections have been established as well as five combinations of three selections in each combination. The combinations are to provide genetic diversity, which is typically found in multi-parent clones.

The combinations are based on the observations of Daryl Sellar (superintendent, Glenelg Golf Club) where in his studies he noted that there were three broad categories of bentgrasses – a very fine dense type with minimal lateral extension, a coarser textured type that exhibit vigorous lateral extension and an intermediate type. The three types play various roles in a mixed sward that responds to changing conditions throughout the year but in combination provides a consistent playing surface.

The trials will be conducted over the next two to three years with additional sites established in NSW and SA.

The recently planted AGCSATech bentgrass trial plots

FINE FESCUES

Fine fescues (*Festuca* species) have been extensively used on golf courses in the southern states of Australia to great effect in roughs, and greens and tees surrounds. The fine leaves, colour and texture of this group of grasses provides an ideal contrast with couchgrass and bentgrass and with the wispy nature of the seed heads provide a strong "native grass" look that suits the Australian environment. (*See Inside The Open, page 20*)

The genus *Festuca* contains about 450 species found in temperate regions throughout the world, extending through the tropics and on mountaintops. Beard (1973) reported the use of fine-leaved *Festuca* spp. as early as the 16th Century for golf turfs and are found extensively on the links courses of Scotland.

The fine fescues are seen as a grass with increasing potential due to its perceived environmentally-friendly characteristics of low water use, shade tolerance and low fertility requirements. However, cultivars vary in seedling vigour, seasonal quality, spring green up and colour, with some variability in the establishment rates among some specimens. ▶

BY JOHN NEYLAN

The fine fescues are seen as a grass with increasing potential due to its characteristics of low water use, shade tolerance and low fertility requirements

The *Festuca* spp. are well suited to well drained, acid (pH 5.5-6.5) sandy soils, though they thrive on the Mornington Peninsula where the pH is often greater than 8.0 and as high as 9.5. They are well adapted to infertile soils, however, in establishment they do respond to moderate levels of nitrogen and regular watering. Once established the fescues need to be gradually weaned off the fertiliser and water and will persist very well with little or no inputs. At high levels of fertility and water the fine fescues will produce a dense layer of root mat.

The so-called fine-leaved fescues are taxonomically very complex and there is ongoing argument as to where specific subspecies belong. The fine fescues that are used in Australia are most likely to be from the genus *Festuca* L. and the subgenus *Festuca* with two broad categories known as *F. rubra* (red fescue) and *F. ovina* (sheep fescue) complexes (Ruemmele et.al. 2003). Within the *F. rubra* complex there are the species *F. heterophylla* Lamarck (shade fescue) and *F. rubra* L. Within *F. rubra* L. there are the subspecies *commutata* Nyman (chewings fescue), *litoralis* Auquier (slender creeping red fescue) and *rubra* Gaudin (strong creeping red fescue).

Within the complex *F. ovina* there are several species including *F. filiformis* Pourret (hair fescue), *F. ovina* L. ssp. *hirtula* (sheep fescue) and *F. trachyphylla* Krajina (hard fescue). Another species that is often included in this group is *F. glauca* or blue fescue, however, many researchers consider it to be a "blue form" of *F. trachyphylla* Krajina rather than a separate species. These "blue forms" have been erroneously designated as *F. ovina* L. ssp. *hirtula*.

The fine fescue mixes used for golf course roughs often include a blend of hard, creeping red and sheep fescue with so-called blue fescue at times being included as an alternative to sheep fescue. In discussions with Leah Brilman, an American plant breeder from Seed Research, the differences between a true sheep fescue and the more generic blue fescue are morphologically and taxonomically very difficult to differentiate and unlikely to make any difference to the look and performance of the turf.

The blue forms can be confused with sheep fescue with the only true sheep fescue cultivar being Quattro. In terms of the seed mix, if true sheep fescue is required then specify Quattro, or if the general "blue look" is all that is really required then sheep or blue fescue is acceptable. In terms of growth and persistence there is unlikely to be any perceivable difference.

The fine fescues have been used extensively on golf courses on the Mornington and Bellarine peninsulas and the Melbourne sand belt. More recently they have been used at Glenelg GC in Adelaide and on the new Magenta Shores project north of Sydney.

High humidity and poor drainage appears to be the main limiting factor in establishing and maintaining the fine fescues. As a group, *Festuca* spp. does not have very good disease resistance but through plant breeding disease tolerance is being improved. As a general observation, *Festuca* spp. does best on well drained sandy soils in a low humidity environment but shows good persistence with high summer temperatures.

The fine fescues are relatively slow to establish and require regular watering and moderate fertility to get them established. They are best sown in the autumn and allowed to grow and mature through the winter before being subjected to high summer temperatures. In my experience they take about 18-24 months to achieve the required level of maturity.

As a mature turf they tend to take on a clumpy appearance where there is no water and maintain a relatively dense and uniform turf under higher inputs. One concern with the fine fescues is their inability to tolerate heavy traffic and will quickly show burn marks during warm weather when subjected to vehicular traffic.

The *Festuca* spp. have found a niche in Australian golf courses and are being used as a grass that has a 'native grass' look that is considerably easier to establish than many native grasses (i.e. from seed). Whether it can be established further north is an unknown and is presently being mixed with common couchgrass to provide more diversity.

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Coring and subsequent topdressing are essential practices in controlling beneficial levels of organic matter in putting surfaces

Getting to the core of organic matter accumulation

Controlling the level of organic matter in the profile of golf greens is a constant challenge for superintendents. In this instalment of Tech Talk, Andrew Peart looks at the negatives of excessive organic matter accumulation and looks at effective methods of maintaining healthy putting surfaces.

Most golf greens in Australia have recently undergone renovations that have included processes such as hollow coring and topdressing. This process is performed at least once a year, but preferably more, to remove and dilute accumulated organic matter that has built up.

Excessive organic matter can be frustrating to the golfer as it leads to excessive ball marks, foot printing and inconsistent ball roll. For the superintendent it can mean increased likelihood of disease, possible scalping by trying to achieve more green speed from wet surfaces and hydrophobic soil conditions developing over summer.

Along with the challenges it presents to the golfer and the superintendent, it can also have some dramatic negative impacts on the function of the profile. Golf greens are often built to strict specifications, however, after a green is planted or sown these parameters quickly change. The main reason for the change in profile dynamics is due to the accumulation of organic matter, whether from roots or decaying plant material.

The percentage of organic matter can be described in two ways. Often at the time of construction a sand may be amended with a certain percentage of organic matter by volume to achieve better moisture retention and/or cation exchange capacity. However, if a sand is checked for organic matter content in the laboratory the result will be given on a weight basis.

Amending by volume is far different than by weight. Carrow 2004 states that one per cent organic matter by weight equals about five per cent organic matter by volume.

NEGATIVES OF EXCESSIVE ORGANIC MATTER

Many researchers have documented decreases in saturated hydraulic conductivity as putting greens mature. Concurrent with a reduction in saturated hydraulic conductivity has been an increase in organic matter content within the surface two inches (Carrow, 2004).

The rate of saturated hydraulic conductivity is dependant on the amount of macropores within the profile. The accumulation of organic matter reduces the amount of macropores and hence reduces the drainage rate of the profile. Carrow 2004 states that research has consistently demonstrated that as organic matter content in a sand mix increases to above four to five per cent (by weight), the percentage of larger soil pores (macropores) of >0.08mm diameter between sand particles decreases due to plugging by organic matter.

Not only is the amount of organic matter detrimental to a soil's profile but in some cases it is the nature of the organic matter. Organic matter can be structured when it consists of mainly live roots, however more a gel-like consistency as roots die. Root dieback is more likely to occur on cool-season grasses, namely bentgrass, during hot humid weather.

Carrow 2004 states that it is not the lack of roots from root dieback that is the problem, but the creation of an excessively moist layer with very low oxygen during hot weather in response to the rapid root dieback, resulting in the inability of remaining roots to take up sufficient moisture for transpirational cooling.

Other symptoms that are witnessed with excessive accumulation of organic matter

are increased moisture retention due to the reduction of macropores and the subsequent increase in capillary pores, those which hold water. Declining root growth has also been seen and may well be attributed to either lack of oxygen or increased moisture retention in the top of the profile due to organic matter.

Summer bentgrass decline is often stated as the reason for bentgrass greens suffering during high summer temperatures and humidity. However, Carrow 2004 suggests that this is a secondary problem arising from excessive organic matter accumulation and/or changes in the nature of the surface organic matter.

All superintendents know that diluting organic matter accumulation with topdressing material delivers agronomic benefits and firmer surfaces. The dilemma still remains on how to apply the correct balance of topdressing material and keeping golfers content.

DEVISING A PROGRAM

The first step in devising an appropriate program would be to test the upper 50mm of your green to calculate the amount of organic material present. It would then be reasonable to correlate the organic matter test results with turf quality and performance during stressful environmental conditions to determine if there is a need for changing an otherwise successful maintenance program. According to Carrow 2004, this figure should be no higher than four per cent organic matter by weight in the top 50mm.

In New Zealand they have concluded that organic matter be assessed at three different depth intervals. Glasgow 2005 states that it is recommended that for New Zealand sand-based golf greens the target upper level for organic matter in the 0-20mm, 20-40mm and 40-80mm depths be six per cent, four per cent and three per cent by weight respectively.

TABLE 1.
THE IMPACT OF TINE SIZE AND SPACING ON THE AMOUNT OF SURFACE AREA IMPACTED BY CORE AERIFICATION

Tine Size Diameter (inches)	Spacing (inches)	Number of Holes per Square Foot	Surface Area Impacted by One Tine (square inches)	Percent surface Area Impacted	Number of Aerifications Needed to Reach 20% of Surface Area Impacted
1/4	1x1	144	0.049	4.91%	4.1
1/4	1x2	72	0.049	2.45%	8.1
1/4	2x2	36	0.049	1.23%	16.3
3/8	1x1	144	0.110	11.04%	1.8
3/8	1x2	72	0.110	5.52%	3.6
3/8	2x2	36	0.110	2.76%	7.2
1/2	1x1	144	0.196	19.63%	1.0
1/2	1x2	72	0.196	9.82%	2.0
1/2	2x2	36	0.196	4.91%	4.1
3/8	1x1	144	0.307	30.68%	0.7
3/8	1x2	72	0.307	15.34%	1.3
3/8	2x3	36	0.307	7.67%	2.6

Source: O'Brien and Hartwiger, 2001

Glasgow 2005 stated the discrepancy between the proposed threshold levels for NZ golf greens and those for greens in the USA largely reflects the differences associated with climate, with the temperate weather conditions throughout much of New Zealand offering less pressure on the turf system from disease, temperature stress etc.

Thus, the impact the amount of organic matter has on the turf over the summer period would seem to be directly correlated to the severities of the summers and usage pressures.

AGCSATech recently took a plug for analysis to assess the amount of organic matter that had accumulated in the top 50mm of a four-year-old bentgrass green that had never been cored and only topdressed on an ad-hoc basis. The depth of thatch was 15-18mm and after a loss on ignition test it was determined that it contained 3.4 per cent organic matter by weight. This would indicate that future renovation work such as coring and dusting would be required to maintain the organic matter at this level.

O'Brien and Hartwiger 2001 stated that in their experience, golf courses with successful mature greens have been on a core aeration program where 15-20 per cent of the surface area has been impacted each year. The amount of area impacted will be a result of the frequency of operation, tine spacing and tine size. Table 1 provides a list of tine diameter and spacing to achieve per cent surface area impacted. For example, using 12mm diameter tines with a spacing of 50mm x 50mm impacts only not quite five per cent of the surface area. ▶

This can be quadrupled to nearly 20 per cent if done on a 25mm x 25mm spacing.

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

Dusting is also a key component in managing organic matter levels. O'Brien and Hartwiger 2003 state that applying at 40-50 cubic feet of sand per 1000ft^2 (1.2-1.5 m^3 per 100m^2) per year is recommended to keep organic matter content below three to four per cent by weight in the upper portion of the rootzone. This rate of sand application is similar to that recommended by Nickson 2003 who suggested a dusting program consists of an application of 0.06-0.1 cubic metres of sand per 100m^2 of turf every two weeks in good growing weather and reduced to every month in winter. Such a program would require a total of around 18-20 dusting applications per year.

The best method to apply such a quantity of sand is to include a certain amount of coring, depending on the existing amount of organic matter present along with regular sand topdressing or dustings. When coring it must be remembered that core holes less than 12mm in diameter are difficult to backfill, even with dry sand, due to the sand having a tendency to bridge.

Core holes less than 12mm in diameter can be difficult to backfill

CONCLUSION

Carrow 2004 states that regardless of climate zone, greater than four per cent organic matter content in the surface two inch (50mm) zone becomes a red flag value that indicates the probability of developing low oxygen, excessive surface water retention, and reduced saturated hydraulic conductivity. As organic matter increases above this value the greater the potential for these problems to occur.

A loss on ignition test can be undertaken to determine organic matter levels to gauge the effectiveness of current renovation techniques and whether more sand needs to be incorporated to reduce the likelihood of the associated problems.

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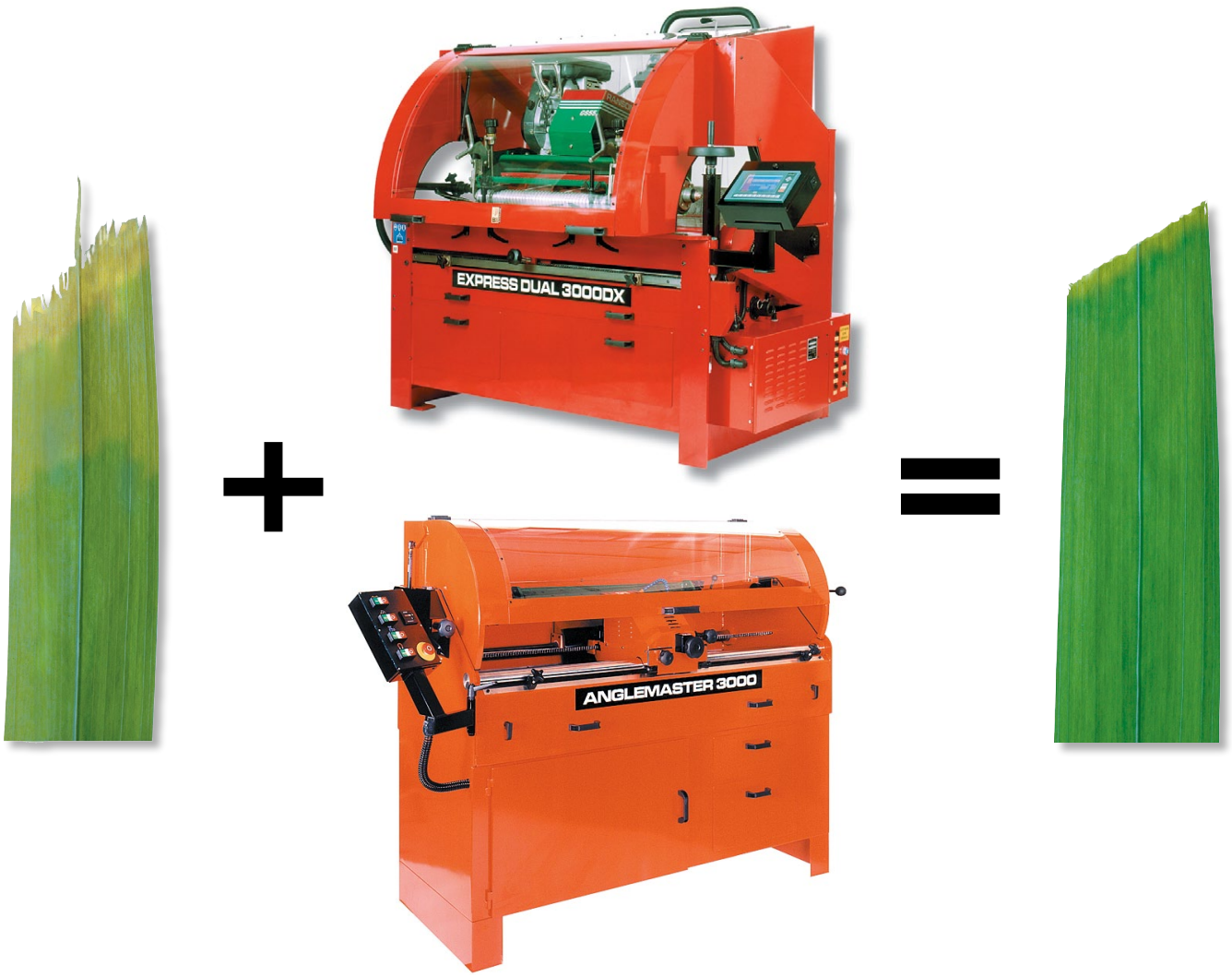

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TORO TURF TOUR

Brookwater has been a 'red shed' since the early days of construction

Superintendent: David Lunardelli

Brookwater Golf Club superintendent David Lunardelli is dreaming of a red christmas With a change-over of Toro fleet lease agreement recently completed, Lunardelli is set to take delivery of some brand spanking new red machinery in the lead up to Christmas, the perfect festive season gift any superintendent can give his course and crew.

It will be a case of out with the old and in with the new, with some of the departing machinery having been gainfully employed at Brookwater since the initial days of construction. Such has been the reliability and serviceability of the existing Toro equipment, Lunardelli has had no hesitation in renewing the lease and is eagerly looking forward to the delivery truck rolling up to the shed gates come December.

In the industry of the past 19 years, Lunardelli has been superintendent at Brookwater right from its initial construction five years ago. Prior that he was construction manager at Pelican Waters on the Sunshine Coast and before that held positions at Caloundra and Gainsborough Greens golf clubs.

Lunardelli took the Brookwater job in order to become involved with course construction and stay on as a superintendent. Also, the opportunity to work on a high profile Greg Norman course was extremely attractive as was the chance to work under Troon Golf.

Unique is really the only word you can use to describe Brookwater. Opened in March 2002 and located 35 minutes south of Brisbane's CBD, the golf course has been cut out of the natural Springfield bushland and as such the topography is pretty extreme.

Every hole on the course is spectacularly framed by established Ironbarks and Eucalypts, and, as Lunardelli says, even when the course opened it looked like it had been there forever and a day.

In a short time Brookwater has won many admirers, not just for its stunning Norman layout but for its exemplary presentation which Lunardelli and his staff of 14 are responsible for. Playing a huge role in winning these accolades has been the course's extensive Toro fleet.

As any superintendent will tell you, trust and confidence in their fleet is paramount to the presentation of a course which is why the Brookwater shed is remaining red. In changing over to a new lease agreement, Lunardelli will

LOCATION: Brookwater Golf Club, Queensland

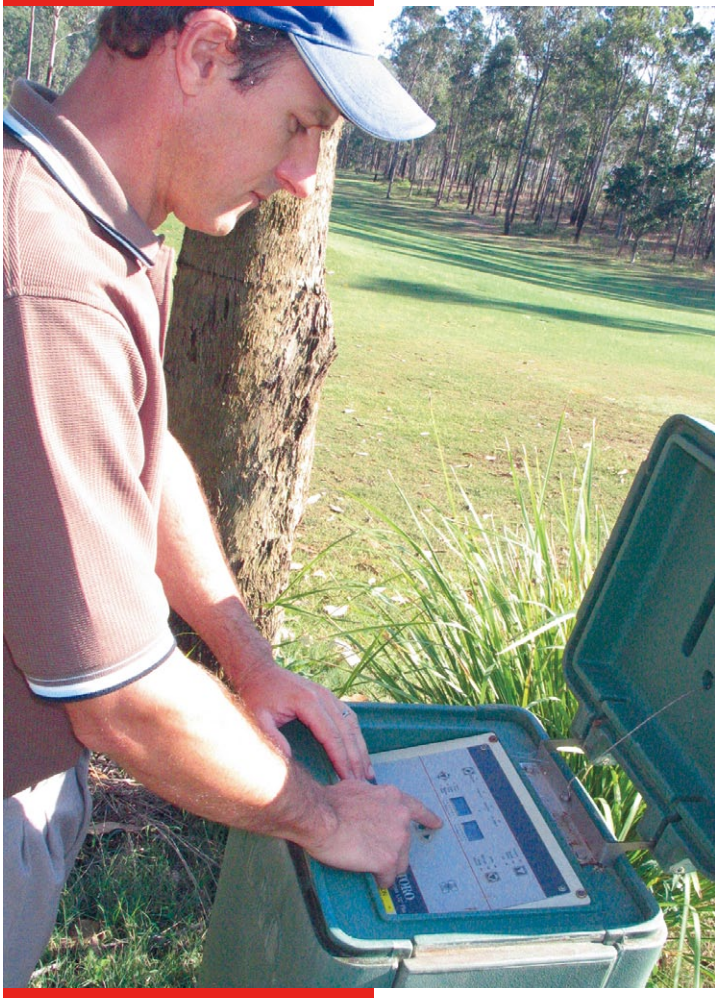
be upgrading some of his equipment, but for the most part will be sticking with the status quo due to high level performance and suitability to the Brookwater site.

"Brookwater is managed by Troon Golf which has an alliance with Toro worldwide, but it is still horses for courses," says Lunardelli. "As a superintendent I still get to push what machinery I want in here and what fits best for this course.

"We had the majority of our Toro machinery through construction. The confidence has been that all those items have been under fairly heavy scrutiny during that phase and have been able to stand up to the rigours of maintaining this course. We're really happy with all our Toro machinery. They suit us and the site really well."

Lunardelli's fleet certainly gets a good workout with the intensive maintenance regimes employed at Brookwater. The CT2 (GN1) fairways and greens surrounds get shaven twice a week, the Santa ana tees are cut three times a week and the Tifdwarf greens are cut with Toro 1000 Greensmasters every day (Lunardelli says walk-behinds are used to cut greens 80 per cent of the time). The current Brookwater Toro fleet includes:

- Six Greensmaster 1000 walk-behinds;
- Two Greensmaster 3100 triplexes (which will be upgraded to the 3150D diesel units);
- Two Reelmaster 3100D Sidewinders;
- Two Reelmaster 6500D 4WD fairway units;
- One Groundsmaster 328D 4WD;
- Eight 2100 Workmans (which will be upgraded to the 2110 Workman, including the trialling of a 2050E electric utility);
- Two 3300 Workman utilities (will be going from the 4WD units to the 2WD);
- SandPro 5020;
- ProCore 648 greens aerator;
- Rake-o-Vac;



Brookwater superintendent David Lunardelli says Toro is a perfect fit for the Queensland course

TORO TURF TOUR

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Brookwater has won many admirers, not just for its Norman layout but exemplary presentation

- Multi Pro 1200 sprayer; and
- Toro Site Pro satellite irrigation system with 700 series sprinklers (looking at upgrading to 800 series in future).

So what makes Toro the right fit for Brookwater? Well, according to Lunardelli there are a number of important aspects – quality of machinery, reliability and a proven track record in handling the unique topography at Brookwater.

"Because of the topography and the hilly nature of the site, transmissions, braking systems and hydraulics are put under a lot more strain than they would be at other courses," says Lunardelli. "We have to make sure from a safety perspective that the machines we use can cope with some of the hills.

"We find that we are able to maintain the quality of cut despite some of the extreme slopes and hills on the course. The 6500 Reelmaster 4WD fairway units have been a must. We're not leaving tyre tracks when we're mowing hills. And it's the same with the Sidewinders. We find that on our slopes the ability to slide the cutting heads across is a huge advantage for safety."

Due to the undulating nature of the site, it is no surprise then that the 3100-D Sidewinder is at the top of Lunardelli's must-have list: "We can get the Sidewinder into so many areas, like close to bunker edges, that other similar types of vehicles would struggle to get to. It saves so much time, particularly in the growing season, and means we don't have to have a man out flymowing all the time. All round it's a great unit and one that gets a good workout at Brookwater."

Ask Lunardelli what impresses him most about Toro, and it's a response that echoes the sentiments of other superintendents who are loyal to the Toro brand.

"The number one thing for me with Toro is that across the board, especially when we're talking a whole fleet, as a superintendent I can have confidence in every piece of that fleet," says Lunardelli, who also rates Toro's after-sales service extremely highly.

"We are really happy with the Toro equipment and I think the proof of that is in the fact that we are happy to change our fleet over four years down the track and have no hesitation in doing so."

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THE PULSE

Following last edition's look at contract maintenance, this instalment of The Pulse poses the question to former AGCSA Distinguished Service Award winners, 'what has been the single biggest development to impact upon the Australian turfgrass industry over the past 30 years, and where will the industry be in another 30 years' time'.

Doug Robinson
DSA 2002

To isolate a single development is extremely difficult. Irrigation is just one area which has seen incredible developments. Thirty years ago many golf courses were reliant on manual watering using hoses and sprinklers. The more advanced courses may have had 'semi-automatic' or quick coupling systems that still required some form of manual operation. Today, of course, we have computer-controlled systems that work in conjunction with weather stations and even moisture sensors. Today's systems conserve water, labour and benefit the environment.

Development in mowing equipment has been very significant as has the changing technology in pesticide usage. Target-specific chemicals and specialised spray units have made pest control almost a science in today's workplace, requiring education and qualifications never dreamed of 30 years ago.

However, I believe the single biggest development to impact has been the Australian Golf Course Superintendents' Association. Thirty years ago the turf industry was made up of small fraternal groups, all with a common cause but not achieving very much in real terms. With foresight and hard work by many, the AGCSA has ultimately developed into an industry leader forging inroads into education, research and development of an industry that serves this sports mad country of ours with great conscience and responsibility.

Thirty years ago the people charged with the maintenance of golf courses, racetracks, playing fields were simply considered the greenkeeper, curator or the bloke who does the mowing. Today's turf manager is a trained professional whose responsibilities go way beyond those of 30 years ago. As for the next 30 years, I'll be approaching 90 – if I'm still around let me know how things turn out.

Peter Brown
DSA 2005

There are probably two events that have impacted significantly on the sports turf industry during the past 30 years. Firstly, the Australia Commonwealth Government's adoption of Plant Breeders Rights (PBR) legislation in 1994 has provided the agricultural, turf and horticulture industries with an ever-increasing choice of new plant varieties from which to choose.

During the last five years we have witnessed a significant increase in the number of warm-season grass varieties in the market place. In particular, numerous new varieties of the genera stenotaphrum, cynodon,paspalum and recently zoysia have been released. Many of the new varieties have been bred overseas, but a number have been developed here.

However, the most recent significant development to influence the sportsturf industry is the ever-growing water crisis.

The search is on for alternative water resources like never before. If none can be provided, many sportsturf facilities on town water may lose viability. Redirecting and harvesting urban run-off and development of waste-water are strategies to be considered but are expensive to initiate and often face bureaucratic hurdles.

The water crisis issue effects everyone, not just the sportsturf industry, although the industry will be the first to suffer. Will things get better? Will urban planners and politicians be up to the task to ensure adequate water supplies in the future? What changes will turf managers and the sportsturf industry make to survive what looks like being an increasingly warmer climate with erratic rainfall patterns?

I have some suggestions that may answer the above questions, as no doubt many of us do. It's our job to push some ideas and proposed solutions to those responsible for future sustainable development.

Peter McMaugh
DSA 2000

The question asked is a difficult one because there have been huge changes in so many of the multifaceted aspects of the turfgrass industry. I have been involved with many of these changes from machinery, chemicals, pest and disease control, weed control, construction materials and I am still working today on these many fronts.

However, I go back to some words of wisdom that I received from Dr Glen Burton early in my career. He said to me, 'Peter, you will do more for the turf industry by producing a good turfgrass than by chasing around all the other areas which need help'. I took that to heart and have worked over the years to produce and introduce grasses from other breeders to give us improved surfaces.

Wintergreen couchgrass, which John Neylan describes as an 'oldie but a goodie' was the first grass I released and it has become an Australian industry standard. It has been used by others as the basis on which to build new varieties which have changed the face of seeded couchgrasses worldwide. Princess is one such grass.

The changes in the quality of bentgrasses, from Pennstate, and the quality of rye and blue grasses from Rutgers are also standout programs in this area. There are breeders today working on lots of new and exotic grasses, but when it comes down to the line, the old workhorse couch still offers us lots of room to keep the changes going.

SYNGENTA VALUES THE OPINIONS OF THE TURF INDUSTRY AND RECOGNISES THE CONTRIBUTION OF SUPERINTENDENTS' RESPONSES WITH A $50 EDUCATIONAL VOUCHER

Peter Sawyer
DSA 2002

Where do you start with such a question? To put it mildly, the turfgrass industry has exploded in the past 30 years, whether it be technology, academics, agronomics or advances in OH&S, irrigation and chemicals. To single out the one major development would start healthy and considerable debate.

From my point of view, I would consider the available training, accessible knowledge and university courses that are available for the turf manager and student today as the single most influential impact.

Without hesitation the available information, whether it be by specific course or the Internet, is truly astonishing when compared with 30 years ago. The turf manager and aspiring students are clearly better informed and are able to access all sorts of information.

The advancement in machinery and computers during the past 30 years is phenomenal to say the least. Today we take for granted such things as computerised, self-propelled, hydraulic, electronic – the list is endless. Just over 30 years ago these advancements were dreams or in the infancy of development.

Another major advancement has been the development of safer and target-specific chemicals and the evolution of spray equipment. The end users and public have demanded safer chemicals, which has driven the development of chemical technology.

Turfgrass varieties and management practices have advanced in leaps and bounds to the point that great sporting facilities are no longer confined to wealthy organisations or clubs and are now the norm throughout sport.

Where will the turf industry be in 30 years? Hopefully safer and wiser. Expanding technology must equate to working less, expecting more and standards and presentations improving.

Ray Keane
DSA 2004

When I look back over the past 30 years, I'm amazed that people working in the turf industry survived through this time, considering the 'nasties' that were used. Fungicides containing mercury, herbicides containing 2,4-D and many more, there were certainly people who suffered, and are still suffering because little or nothing was known of the dangers.

Dangers weren't confined to chemicals either. There were potential hazards with the daily use of all sorts of basic machinery as well. With this in mind, the improvement in workplace health and safety certainly must rank fairly high in changes for the good.

But for me, the biggest impact for the industry would be in the area of education. There has been a tremendous expansion in this field over the past decade. The state superintendent associations were very much a part in starting new training schemes, and over the years, under a more national approach, these have been combined and expanded.

The dissemination of knowledge has improved not just in the colleges. There are now regular magazines and newsletters etc with all sorts of information. Thirty years ago one relied on word of mouth to find out what worked or what didn't, which to a big extent came by attending association meetings or relying on a well-informed sales rep.

So what of the next 30 years? If I can look back 30-plus years and be amazed, attempting to look forward a similar period is puzzling to say the least. However, there does seem to be a pattern emerging in the golf area – the role of the superintendent is changing. He is becoming less hands-on and more an administrator. For me this is a little sad because without the hands-on you will surely miss out on many of the rewards the profession has to offer.

Improved cultivars of seashore paspalum are finding their way onto golf courses around the world. The course shown is from the United Arab Emirates where grasses are often managed under severe salinilty, drought and high temperatures

Seashore paspalum

Ecotype responses to drought and root limiting stresses

Research continues at the University of Georgia to screen ecotypes of seashore paspalum for overall drought resistance in a field dry-down situation and for tolerance to root limiting stresses. Here, Dr Bob Carrow outlines this ongoing work.

Increasingly, turfgrasses are grown under severe environmental stress conditions such as reduced irrigation, saline irrigation water, and poor soil conditions, not just on golf courses but also for land reclamation purposes and other landscape sites.

Grasses with genetic-based resistance to climatic, soil (edaphic), pest, and traffic stresses is foundational for development of environmentally sound turfgrass management regimes and for adaptation to harsh areas. A primary paradigm for the seashore paspalum (*Paspalum vaginatum*) breeding/genetics program at the University of Georgia of Dr. Ron Duncan, and more recently of Dr. Paul Raymer, is to systematically develop grasses with superior stress resistances (Duncan and Carrow, 2000, 2002). A critical step in this process is to determine ecotype tolerance to important stresses.

An important stress is drought resistance, including drought avoidance and tolerance aspects (Carrow, 1994). While many physiological, morphological, and anatomical plant adaptations can contribute to drought resistance, our direction for improving drought resistance has been to concentrate on genetic-based resistance to soil chemical and physical factors that directly limit root development and longevity (root maintenance).

Unless a turfgrass can develop a deep and extensive root system and then maintain the root system under adverse soil stresses and repeated drought periods, the grass will not have good drought avoidance characteristics and drought stress can result in field situations too rapidly for all the drought tolerance attributes to be operative.

Carrow and Duncan (1996) and Duncan and Carrow (1999) described these soil root limiting stresses as:

1. High soil strength that limits root growth rate – either from naturally hard setting soils or from soil compaction;
2. Soil drought can cause desiccation and death of roots which varies considerably with ecotype;
3. Acid soil complex which consists of pH low enough to induce Al/Mn toxicity to roots – this is usually in association with nutrient deficiencies (Ca, Mg, K, P) and hard 1:1 type clays such as kaolinite;
4. High sodium levels that cause Na-induced root toxicity by displacement of Ca from root cell walls and plasma membranes; and
5. Low soil oxygen – either from water logging, soil compaction, or soils with too many micropores/too few macropores.

Acid complex soils are very common in

Rabey Bay, a park along a coastal estuary in the US is shown before and after establishment of Sea Isle 2000

tropical, high rainfall regions and these soils are normally kaolinitic clays, allophanes, or soils with very high Fe/Al oxides (Duncan and Carrow, 2000). Another example of very low acidity stress conditions is acid sulfate soils where both high Al/Mn and high Na are present as root toxins. These are usually coastal, marine, 1:2 clays, however, this stress can also occur on some inland soils.

The research summarised in this article relate to screening of ecotypes for overall drought resistance assessment in a field dry-down situation and for tolerance to root limiting stresses. Studies were conducted at the Griffin Campus of the University of Georgia.

DROUGHT RESISTANCE OF FAIRWAY TYPE SEASHORE PASPALUMS

On 16 July 1998, nine seashore paspalums and Tifway bermudagrass were established by sprigging on an Appling sandy clay loam (clayey, kaolinitic, thermic typic Kanhapludualt). The A horizon of 20cm was pH 5.3 and the B horizon was pH 5.1. Fertilisation was by soil test for all nutrients except N.

Nitrogen was applied each year in April, June, July, and late August at 0.49 kg/100m^2 each date using 10-10-10 in April and August and urea the other months. Mowing was at 16mm twice weekly with clippings returned. Irrigation for establishment was to prevent drought stress. Each grass treatment was replicated four times in 3.6x3.6m plots in a randomised complete block design.

All grasses were subjected to periodic dry-down periods in 2000 to induce drought stress as indicated by leaf firing - chlorosis/yellowing followed by leaf desiccation and tan/brown appearance of leaves. Visual ratings were obtained for leaf firing (per cent leaves exhibiting leaf firing), visual quality, shoot density, and colour (9.0 = ideal for these parameters). Root samples were obtained using three cores of 6.3cm diameter per plot in early summer and late summer of 1999 and 2000 at 0-30cm and 30-60cm depths.

RESULTS

For the nine seashore paspalums, the rating ranges in shoot performance averaged across 1999 and 2000 were 5.8 to 7.4 for turfgrass quality, 6.1 to 7.5 for shoot density and 6.1 to 7.5 for colour (Table 1). Ratings included those taken during dry-down periods as well as under non-drought conditions.

Out of a total of 34 shoot performance measurements, grasses ranking in the top (best) statistical group the most frequently were Sea Isle 1 (34), Temple 1 (31), TCR 6 (28), and Tifway bermudagrass (27), while Adalayd ▶

TABLE 1. SUMMARY OF TURFGRASS SHOOT PERFORMANCE OVER 1999 TO 2000.

	AVERAGE 1999 AND 2000§			TIMES IN THE TOP STATISTICAL GROUP			
Grass	Turf Quality	Turf Colour	Turf Density	Quality	Colour	Density	Total
	--------- 9 = ideal ---------			12 = best	12 = best	10 = best	34 = best
Adalayd SP	6.0	6.5	6.2	1	3	1	5
Ada. Select 1 SP	5.8	5.9	6.1	0	2	1	3
HYB 7 SP	6.8	7.2	7.0	7	9	7	23
Q36313 SP	6.3	6.7	6.7	3	4	3	10
Sea Isle 1 SP	7.4a	7.5a	7.5a	12	12	10	34
Taliaferro SP	6.5	7.1	6.6	2	7	2	11
TCR 1 SP	6.6	7.1	6.8	4	8	4	16
TCR 6 SP	6.9	7.3a	7.0	9	11	8	28
Temple 1 SP	7.2a	7.5a	7.3a	11	11	9	31
Tifway Bermuda	7.0a	7.1	7.3a	9	8	10	27
LSD (.05) =	.45	.28	.37	-	-	-	-
F-test =	**	**	**	-	-	-	-

SP = Seashore paspalum
***, **, † Significant difference at probability level 0.01, 0.05, and 0.10, respectively.
‡ The letter "a" denotes the top (best) statistical group.
§ Thirteen rating dates in 1999 and 2000.

(5) and Ada-Selection 1 (3) ranked lowest. These data indicate:

- Considerable variability in shoot performance characteristics exist among seashore paspalum ecotypes. Unusually wide variability in many other traits among seashore paspalum ecotypes has been noted (Duncan and Carrow, 2002) relative to most other grasses.
- Under simulated fairway conditions, some ecotypes of seashore paspalum exhibited overall turfgrass quality, shoot density, and colour similar to Tifway bermudagrass.

Leaf firing during dry-down periods under field situations integrates both drought avoidance and tolerance aspects (Carrow, 1996). In the soil conditions of this study, the repeated dry-downs imposed multiple soil stresses (i.e. high soil strength, soil drought, and some acid-soil complex stress). During three dry-down periods (i.e. no rain or irrigation) in 2000 of seven to 18 days duration, leaf firing was noted on all grasses, but there was considerable ecotype differences (Table 2).

Grasses demonstrating the least leaf firing averaged over all dry-down periods were Temple 1 (2 per cent), Sea Isle 1 (3 per cent), and Tifway bermudagrass (12 per cent), while the highest leaf firing occurred on Q36313 (33 per cent), TCR 1 (28 per cent), and Adalayd (27 per cent).

Leaf firing symptoms on the seashore paspalums initially appeared as a slight yellowing of the grass. For the least drought tolerant grasses, this rapidly (within one to two days) resulted in appreciable yellowing of many leaves, especially lower leaves. These leaves then became brown or tan at the tip and progressed down the whole leaf as the drought stress continued. Irrigation before the brown or tan symptoms appeared resulted in full recovery but not once leaf desiccation occurred as evidenced by the brown/tan appearance.

The dry-down data illustrates that drought resistance varies considerably across ecotypes from moderate to excellent for this important characteristic. Some seashore paspalums, including Sea Isle 1, were as drought resistant as Tifway bermudagrass. Huang et al. (1997) observed similar results with drought resistance of Sea Isle 1 (experimental PI 509018) equal to TifBlair centipedegrass and better than common bermudagrass or Emerald zoysiagrass. In our study, Adalayd ranked among the lowest for drought resistance, which was consistent with the results of Huang et al. (1997).

Rooting differences were not apparent in 1999 or June of 2000 (Table 3). However, after the three dry-down periods in July and August 2000, root differences were observed. Total root growth (0-60 cm) was highest for Sea Isle 1, Tifway bermudagrass, Temple 1, and Adalayd in September 2000. In terms of deep rooting (30-60cm) in September, Sea Isle

TABLE 2. LEAF FIRING AND TURF COVER RATINGS IN 2000 ON NINE SEASHORE PASPALUMS AND ONE BERMUDAGRASS

		LEAF FIRING §, #			
GRASS	TURF COVERAGE 5 MAY	18 JULY (14 DAI)	26 JULY (7 DAI)	18 AUG (18 DAI)	AVERAGE
	%	---------- % ----------			
Adalayd SP	93	29	7a	44	27
Ada. Select 1 SP	92	25	3a	45	24
HYB 7 SP	96a	33	4a	18a	18
Q36313 SP	88	48	12	50	33
Sea Isle 1 SP	100a	6a	1a	2a	3a
Taliaferro SP	91	22	<1a	26	16
TCR 1 SP	91	43	11	29	28
TCR 6 SP	97a	17a	2a	8a	9a
Temple 1 SP	98a	1a	0a	4a	2a
Tifway Bermuda	100a	13a	2a	21	12a
LSD (.05) =	6	16	10	17	13
F-test =	**	*	†	**	*

DAI = Days after irrigation
SP = Seashore paspalum
***, **, † Significant difference at probability level 0.01, 0.05, and 0.10, respectively.
‡ The letter "a" denotes the top (best) statistical group.
§ Dry-down periods: 5 July to 18 July; 20 July to 28 July; and 1 August to 18 August.
# Leaf firing: yellowing and/or leaf desiccation resulting from soil dry-down after irrigation.

TABLE 3. ROOTING DATA IN 1999 AND 2000

	1999		2000					
	16 July	9 Sept	26 June			13 Sept		
Grass	0 - 60 cm	0 - 60 cm	0 - 30 cm	30 - 60 cm	0 - 60 cm	0 - 30 cm	30 - 60 cm	0 - 60 cm
	mg dry weight of roots/100m² of surface area							
Adalayd SP	428	438	810	77	887	1233a	202	1435a‡
Ada. Select 1 SP	339	741	1177	84	1261	749	131	880
HYB 7 SP	549	559	930	78	1008	784	98	882
Q36313 SP	340	537	475	70	545	554	93	646
Sea Isle 1 SP	411	540	847	60	907	1479a	785a	2264a
Taliaferro SP	513	490	732	107	839	841a	142	983
TCR 1 SP	539	860	845	206	1051	851a	193	1044
TCR 6 SP	561	792	744	45	789	626	114	740
Temple 1 SP	691	892	676	116	792	836a	360	1196a
Tifway Bermuda	645	538	724	84	808	1575a	458a	2033a
LSD (.05) =	-	-	-	-	-	740	340	1068
F-test =	NS	NS	NS	NS	NS	†	*	*

SP= Seashore paspalum

*,† Significant difference at probability level 0.05 and 0.10, respectively.

‡ The letter "a" denotes the top (best) statistical group.

1 and Tifway bermudagrass were highest and reflected an increase of roots in this zone from late June by 13.1- and 5.5-fold, respectively. Sea Isle 1 was reported by Huang et al. (1997) to develop appreciable total and deep roots, as well as exhibit rapid new root initiation after rewatering following a soil drought.

MULTIPLE SOIL STRESS SCREENING OF SEASHORE PASPALUMS

Eighty four seashore paspalum ecotypes and three control grasses (common bermudagrass, Tifway bermudagrass, Meyer zoysiagrass) were plugged (9.0cm diameter by 7.6cm deep plug; area = 0.007m²) into two adjacent sites:

- Site 1 - severe acid soil complex conditions of pH 4.2 to induce Al toxicity stress (50 per cent Al saturation of cation exchange sites) along with potential nutrient deficiencies (Ca, Mg, K) and high soil strength (kaolinitic clay, 25 per cent clay in A horizon and 48 per cent in B horizon) often associated with this stress complex;
- Site 2 - similar to site one except limed to pH 6.5.

Both sites were maintained with good soil moisture conditions for the first 24 days after plugging on 30 June, 1998, but thereafter no irrigation was applied. Thus, the multiple soil stresses in this study were: acid soil complex + high soil strength + soil drought. Fertilisation was at 0.49 kg/100m² as 10-10-10 on 8 July, 1998 and 17 May, 1999 with Ronstar 2G applied at 2.25kg/100m² on 23 March, 1999. Each ecotype was replicated four times in a randomised complete block within each site using one plug per plot.

On 7 July, 1999 a square grid was laid over each plot and the area of coverage was estimated. The 15 grasses with the greatest coverage in the pH 4.2 plots are presented in Table 4. The two bermudagrasses had the best growth in high pH plots as well as under low pH, where coverage was 42-64 per cent of the pH 6.5 values. Seashore paspalum growth expressed by coverage at pH 6.5 ranged from 1.3-0.04m². At pH 4.2, the range was 0.9-0m² with the top 15 ecotypes exhibiting a range of 0.9-0.1m². Only K7 and HI 19 had growth >0.2m² under low pH, while HI 101 demonstrated greater coverage under low pH versus high pH (this was a consistent trend in all replications of this grass). Thus, a low percentage of seashore paspalum ecotypes demonstrated a reasonable degree of acid soil complex stress tolerance.

These three ecotypes appear to show promise for germplasm improvement for acid complex soils. Sea Isle 2000, which was not in the top 15 ecotypes for acid soil complex stress tolerance, was reported by Lees et at. (2003) to provide rapid coverage of a highly acid (pH 3.4 to 5.2), saline-sodic (15.4-22.5 dS/m), coastal estuary soil. Thus, performance under acid sulfate conditions may differ from acid soil complex situations.

COMMENTS

Substantial genetic-based variation in tolerance to drought and acid soil complex stresses was apparent across ecotypes of seashore paspalum. Implications are:

- Breeders can utilise genetic-based variation for future cultivar improvements for multiple or individual soil stresses.
- When turfgrass managers are selecting a particular seashore paspalum, it is critical to understand that all paspalums do not perform the same in response to stresses such as drought and acidic soils, just as other studies have demonstrated for wear, salinity, mowing height tolerance, and other stresses (Duncan and Carrow, 2002). Seashore paspalum cultivars released without rigorous evaluation under a stress may not perform as well as those tested and selected for superior tolerance. For example, based on over 300 seashore paspalum ecotypes within the original collection by Dr. Ron Duncan (most collected from harsh sites) the approximate percentage exhibiting superior tolerance to various stresses under rigorous evaluation is: drought (20 per cent); salinity (2-4 per cent), acid soil complex (2-4 per cent), and greens mowing height (1-2 per cent).

REFERENCES

A full list of references for this article can be obtained from the AGCSA. ***ATM thanks USGATERO for allowing publication of this research article.***

TABLE 4. ACID SOIL COMPLEX RESPONSES OF TOP (BEST) 15 GRASSES.

Grass	pH 6.5	pH 4.2	Percent of pH 6.5 cover
	m2		%
Common bermudagrass	3.11	2.0	64
Tifway bermudagrass	2.1	0.9	42
K 7 SP	0.87	0.41	48
HI 19 SP	0.63	0.19	31
FL 4 SP	0.63	0.16	27
K 8 SP	0.77	0.14	18
FL 60 SP	0.59	0.12	21
Meyer zoysiagrass	0.32	0.11	35
HI 101 SP	0.06	0.11	200
HI 35 SP	1.17	0.11	10
K 4 SP	0.59	0.11	19
HI 34 SP	0.86	0.10	12
HYB 7 SP	0.4	0.10	26
PI 509018-3	0.32	0.10	32
TCR 1 SP	0.85	0.10	12
LSD (.05) =	**	**	-
F-test =	0.26	0.09	-

MCG MAKEOVER CONTINUES FOR GAMES

The transformation of the MCG into the primary venue for hosting the 2006 Commonwealth Games has continued in recent months with the installation of the athletics track.

After the conclusion of an epic 2005 AFL Grand Final, the second stage of the arena works commenced at the MCG in preparation for the Games after the initial stage of works was completed prior to the 2004 Boxing Day Test. (*See Australian Turfgrass Management magazine Volume 7.1 Feb-March p8-12*)

Prior to the stage two works starting, one full-length portable cricket wicket was dropped in on the Sunday following the AFL Grand Final. With the Boxing Day Test wicket in place, the designated athletics infield, which measures 8000m^2 was renovated and fenced off.

The irrigation system was reconfigured to only water the athletics infield – that is the turf that was to remain – while the surrounding 12,000m^2 of turf was removed and some of it rotated back to HG Turf's headquarters in Alexandra.

Having removed two thirds of the turf, track works commenced in earnest. Firstly 1,758m^3 of rootzone sand was removed and then the remaining rootzone sand was shaped and consolidated to the contours of the athletics track. The sand was shaped utilising 3D laser technology.

The first layer of asphalt (50mm) was paved as the foundation for the athletics track. Running a paving machine over the free-moving rootzone sand proved a challenge for the athletics contractor.

A second correction layer of asphalt (25mm) was then paved on top of the first layer to the exacting track tolerances required by the IAAF.

Upon completion of the second asphalt layer the rubber surface (13mm) was rolled out and glued into place. The rubber surface covered the entire competition and non-competition areas; that is to the perimeter fence of the MCG, not just the running track.

Significant work was undertaken to reconfigure the irrigation system to ensure no irrigation head protruded through the designated eight-lane running track.

After the track was completed, a temporary turf system was then laid across the competition and non-competition areas (two thirds of the arena).

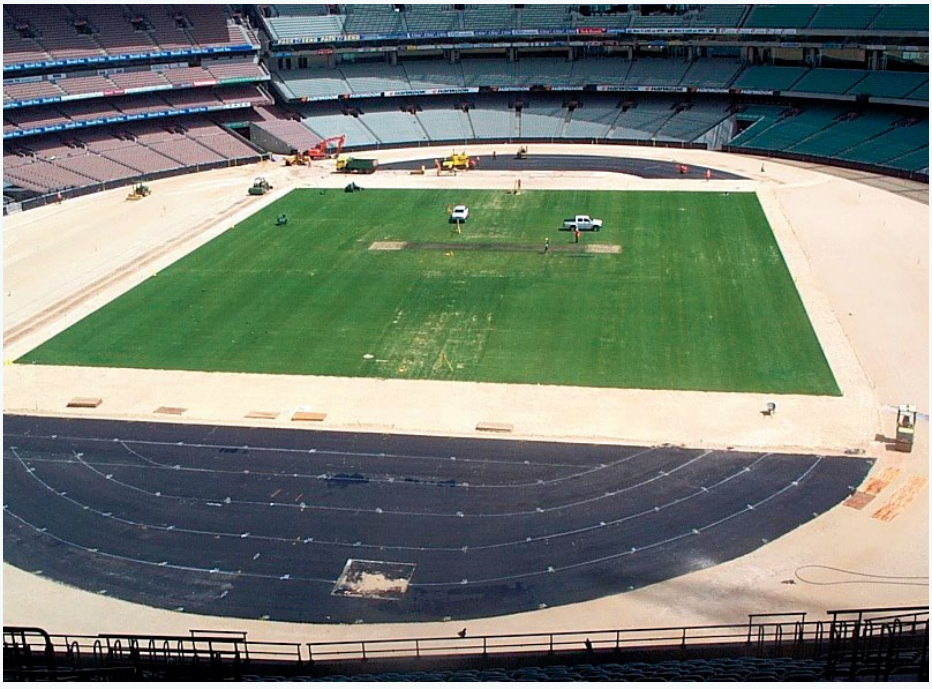
The temporary turf system comprised of a plastic membrane laid over the rubber surface for protection, a 30mm Atlantis Drainage Cell covered with a geofabric for drainage, and varying depths of rootzone sand to provide a flat playing surface for cricket.

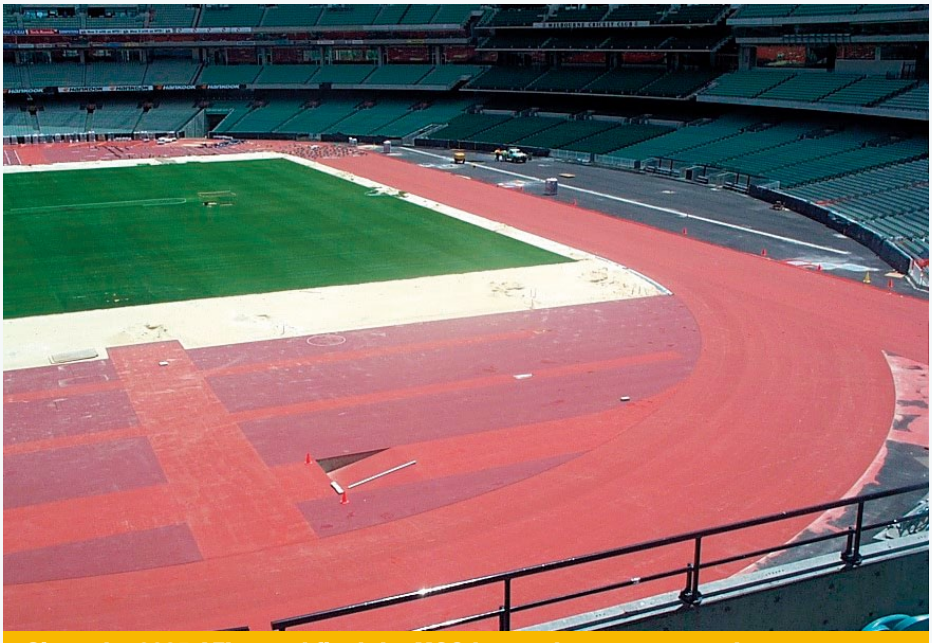
Upon this temporary turf system, 12,000m^2 of Motz turf was laid for the Boxing Day Test. Motz turf had previously been laid over parts of the athletics track at ANZ Stadium in Brisbane when NRL/athletics shared the stadium.

The temporary turf system proved successful with excess water draining away through the drainage cell, and the rootzone sand holding moisture for the health of the turf between irrigation cycles – essential for a cricket arena where the playing surface may only be watered after the conclusion of each day's play.

Following the 2005 Boxing Day Test, stage three will see the turf and temporary turf system removed and the athletics track exposed and cleaned ready for the 2006 Commonwealth Games which begin on Wednesday, 15 March.

Following the Games, the final stage or works will start in April with the removal of the athletics track, levelling the field and installing Motz turf in readiness for the ANZAC Day AFL clash between Collingwood and Essendon.





Since the 2005 AFL grand final the MCG has undergone yet another transformation in the lead-up to the 2006 Commonwealth Games

HAYDU SET FOR DOWN UNDER VISIT

Professor John Haydu

Eminent University of Florida professor John Haydu will spend 2006 in Australia and New Zealand conducting studies on the economic importance of the turfgrass industries in both countries.

Haydu will touch down in Australia in July next year and will work alongside Dr. David Aldous at the University of Melbourne. During this period they will conduct economic studies of the Australian turfgrass industry which will examine and document in a comprehensive fashion the size, dollar value, and economic contribution of the industry to the Australian economy.

While in Australia, Haydu will also be a keynote speaker at the 22nd Australian Turfgrass Conference which will be held in Brisbane from 17-21 July.

Before visiting Australia, Haydu will head to New Zealand with his wife and youngest daughter for six months to work with the New Zealand Sports Turf Institute (NZSTI) and the New Zealand Sports Turf Training Organisation (NZSTITO).

The primary purpose of the visit will be to conduct a national survey of the New Zealand sports turf industry to identify current and future labour skill needs. As part of this assessment, the study will also document the size and scope of the industry in terms of employment, resource use, and revenues generated.

Haydu is a professor and agricultural economist with the University of Florida based at the Mid-Florida Research and Education Center in Apopka. Haydu has been working for the University of Florida since 1988 with primary efforts targeted at the nursery and greenhouse industries. His research has focused on assessing the size, structure and economic importance of these two industries.

In doing so, trade associations have used this information for promotional purposes, to attract outside investors, and as leverage with legislators when confronted with potential regulations or restrictions on various resources, including land, water, and agricultural chemicals used in the production process.

In the turfgrass area, examples of his research include:

- A series of studies profiling Florida's sod production industry;
- A comprehensive study of the Florida turfgrass industry that documented it's contribution to the state's economy;
- An economic impact study of Florida's golf course industry;
- A first of its kind national study documenting the economic impact of the US Green industry (both turfgrass and nursery); and
- A first of its kind national economic impact study of the US sod production industry funded by Turfgrass Producers International (currently under review).

Since his arrival at the University of Florida, Haydu has published two books, four book chapters, and a total of 268 research, extension, and trade journal manuscripts covering turfgrass and nursery related topics. Over the past 10 years he has also presented 27 national and international lectures. A selection of his publications can be found at http://hortbusiness.ifas.ufl.edu.

LETTER TO THE EDITOR

Dear Editor,

I refer to your article "Recollections from the top" (*Australian Turfgrass Management magazine, Volume 7.5 October-November 2005*) in which you conducted a question and answer interview with the retiring AGU executive director, Colin Phillips. I wish to make the following observations regarding Colin's comments on the 2002 Australian Open at the Victoria Golf Club.

In the subsequent weeks after the completion of the 2002 Australian Open a "gentleman's agreement" was established between the AGU, Victoria Golf Club and myself, as the club's course consultant. In essence, the agreement was that it was not in the best interests of any party to comment publicly regarding the events of the week of the 2002 Open. The Victoria Golf Club and myself have been true to this agreement and have not since spoken publicly about the event.

It is with dismay that Colin Phillips has again commented on the 2002 Open and appears at every instance to be distancing himself and the AGU from any fault in the lead up to and the events of the Open week. He continues to 'rewrite history' to suit his own agenda knowing that in the past Victoria Golf Club and myself will not challenge his distortions.

Clearly, the readers of your magazine will make up their own mind as to the validity of his comments. However, I would expect that all those who are charged with the responsibility of golf course preparation would view with skepticism his statements that "we were not fully informed as to what was happening". I am sure that comment is familiar to many managers of turfgrass the world over.

I guess the "gentleman's agreement" is finally over; I am just glad it wasn't me who broke it.

John Sloan,
Managing Director,
Michael Clayton Golf Design

ACCOLADES FOR ALDOUS


Dr David Aldous

University of Melbourne associate professor David Aldous was the recent recipient of the Frank Stewart Award which is handed out by the peak park professional body, Parks and Leisure Australia.

Aldous was presented the award in recognition of his significant contribution to the development, promotion and advocacy of the park and leisure industry of Australia over many years.

The Hon. Frank Stewart was a Federal Minister for Sport and Tourism in the Whitlam Government of the early 1970's and was instrumental in developing the national institute for sport and the culture of sport and recreation in Australia.

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NEW SERIES GATORS GEAR UP

John Deere has added the T-Series Gator to its range of rugged and versatile utility vehicles. The introduction of the T-Series, or Traditional Series, comes on the back of last year's Compact Series Gator and High-Performance Series Gator.

There are two models in the new T-Series – Gator TX and Gator TH 6x4. Both of the new models are faster (top ground speed of 32kph) and more powerful than the previous generation Gator, while also offering improved braking capabilities, increased payload and enhanced operator comfort.

The Gator TX is equipped with the new 9.7 kW (13hp), 401cc Kawasaki FJ400 engine, all-wheel suspension and all-wheel hydraulic disc brakes. All-wheel suspension and a 72mm longer wheelbase enhance ride quality. The Gator TX has a 1.115m long cargo box with a 272kg capacity and an overall 454kg payload/towing capacity.

The Gator TH 6x4 is powered by the new 14.2 kW (19hp), 675cc Kawasaki FH601 engine. Coupled with a transmission that is geared for increased power and low-end torque, drawbar-pull has increased by at least 25 per cent.

The Gator TH 6x4 comes with a 1.115m long cargo box with a best-in-class, 635mm load height. Box capacity is 454kg with a total payload/towing capacity of 635kg.

John Deere has also recently released the 997 Diesel Z-Trak mower for those operators seeking a heavy-duty mower with zero-turn-radius manoeuvrability.

John Deere's new 997 Diesel Z-Trak mower

The newest, toughest addition to the John Deere Z-Trak family, the 997 is designed for heavy-duty commercial and governmental applications, featuring a 23kW (31hp) Yanmar engine and the industry-exclusive 7-Iron deck.

The three-cylinder, liquid-cooled diesel engine provides plenty of torque to power through the toughest conditions. A fully enclosed engine compartment reduces overall engine noise, making it ideal for governmental requirements.

Operators can choose from a 60 or 72in 7-Iron side-discharge deck or 60in. rear-discharge deck. The full floating deck provides a powerful vacuuming action to lift grass before cutting, allowing the 997 to handle more material and finish with a professional, groomed appearance.

Adjusting the deck's mowing height is easy with a 'best-in-class' height-of-cut system, with cutting positions ranging from 38-127mm (1.5-5 in.) in 6mm (0.25in.) increments. A hydraulically adjustable deck lift is standard.

In response to customer feedback, the 997 Diesel Z-Trak offers a standard heavy-duty canister air filtration system to increase engine life. The shaft-driven mower deck maximises power transfer efficiency, supported by a hydraulic PTO clutch for smooth engagement. Operators can mow all day without refuelling on a 45 litre fuel tank and change jobsites quickly with a transport speed of up to 18.5kph.

Operators will also benefit from the standard safety and comfort features of the 997, which is equipped with a seat belt and high-clearance, folding two-post ROPS that can be quickly and easily positioned without tools. A deluxe comfort seat with armrests is positioned next to right-hand, ergonomically designed operator controls.

The 997 is backed by a best-in-class, two-year bumper-to-bumper commercial mowing warranty.

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

PGG, WRIGHTSON IN MERGER

Pyne Gould Guinness Ltd and Wrightson Ltd have merged to form PGG Wrightson Ltd. Both PGG Seeds and Wrightson have long histories in the breeding and production of turf seed and the coming together of these two companies will see this strengthen.

The combined company PGG Wrightson Ltd will have a workforce numbering 2600 people and a turnover of over $1 billion making it the 27th largest company in New Zealand.

The Australian turf seed business remains the same with Cameron Henley as PGG Wrightson national turf seed manager and can be contacted on 0418 880 633.

RAIN BIRD ROUNDABOUT

Rain Bird Australia has announced the appointment of Dean Johnson to the position of turf sales specialist for Queensland. Johnson, who was previously the customer service and marketing co-ordinator at Rain Bird Australia in Tullamarine, will be based in Brisbane. He replaces Troy Barbour who is now Rain Bird Australia area manager golf for Vic, Tas, SA, WA and NZ. Barbour will be based in Melbourne. **For more information freecall 1800 424 044.**

WEB CONQUEST

Superintendents and turf managers wanting to find out more about new couch variety Conquest can now do so online.

A website about Conquest has been launched which includes information on characteristics, commercial and domestic applications, testimonials and current sites which are using or have converted to Conquest and maintenance practices.

The website, www.conquestcouch.com.au, also contains a photo gallery as well as supplier contact details for each state

BACK TO BASICS

O'Sullivan Greens has released a fully organic chemical free liquid soil conditioner into the turf market. Called 'Beyond Organic', its main aim is to promote healthy soil and pH levels with its blend of trace elements, animal manures, fish protein and kelp.

The main target for this environmentally friendly product is soil. Disease is becoming more and more common on many sporting greens with the chemicals being used to combat these diseases becoming more potent. As a result, these chemicals are slowly breaking down what natural nutrients and minerals are left.

'Beyond Organic' has been tested on various bowls greens sites with favourable results in a 12-month period. Three independent tests were conducted and it was found there was a rise in pH from 4.3 to 5.9; an increase in root depth and mass; salt reduction; disease

suppression; and a cut back on expensive chemical use.

For more information about Beyond Organic, contact Shaun O'Sullivan on (07) 5524 8930.

NEW CLEARMAKE DISTRIBUTOR

Queensland-based company Clearmake has announced that it has appointed Icon-Septech as a distributor of its products. Icon-Septech is a national company specialising in precast concrete, access covers and wastewater treatment solutions.

The appointment provides Icon-Septech with access to the full range of Clearmake products which include oil/water separators, stormwater diversion valves, spill detection and control equipment, gross pollutant traps and water recycling systems.

EnviroTrend

GLOBE GOES WITH THE TREND

The latest developments in environmentally friendly, biological turf management are now available to Australian turf managers with Globe appointed distributors of the Australian manufactured EnviroTrend product range.

The range includes Platform and Manager biological inoculants, Huma Base Turf soil conditioner, Kynokelp foliar fertilisers and EnviroCaP, a high Ca soil amendment.

"Encouraging and sustaining soil and plant biological activity is critical to improving plant nutrition and the associated benefits of wear management, disease resistance and overall playability," says Globe product and marketing manager John Cooper.

"The EnviroTrend range is comprehensive. It provides active biological inoculants that place beneficial microbes into the soil and onto the plant and then backs it up with products that will sustain biological activity."

For more information about the EnviroTrend range, contact Globe Australia on 1800 244 300 or see your local Globe representative.

Kubota's new 'Glide steer' GR2100 ride-on mower

KUBOTA GOES FOR A RIDE

Featuring superior turning capabilities with exceptional traction, the new 21 horsepower all wheel drive Kubota GR2100 'Glide-steer' ride-on mower is the latest product to join Kubota's range of mowing equipment.

Fitted with a 1.2m (48 inch) side discharge mower deck, the GR2100 is small enough to manoeuvre in confined spaces yet powerful enough to efficiently mow larger areas.

Not only is the all wheel drive advantageous for mowing in slippery or on undulating ground conditions, it also significantly reduces the turning radius without scuffing. This is achieved by disengaging the drive to the inner rear wheel when making a turn.

By installing a wet mechanical clutch on each rear wheels' drive axle, turning the front wheels to a pre set angle will disengage drive to the appropriate rear wheel.

Unlike conventional four wheel drive mowers, the GR2100 does not have to 'fight' against the forward drive of the inner rear wheel thereby achieving a very tight turn.

The hydrostatic transmission provides the GR2100 with a user-friendly method of controlling both speed and direction. The Kubota GR2100 ride-on comes with a $13.995 price tag.

SYNGENTA APPOINTS TURF TECH SERVICES MANAGER

Dr Henk Smith

South African Dr Henk Smith has been appointed as Syngenta's Australasian technical services lead for turf.

Syngenta marketing manager for turf, Sam Hole, says the newly created position will strengthen the company's commitment to the Australian turf industry. "With Henk in this role, Syngenta will have a greater technical focus on turf," says Hole. "His appointment will enhance Syngenta's scientific information transfer to the turf industry."

Dr Smith joined Syngenta's legacy company Zeneca as a field biologist in 1999. He had previously worked with the Agricultural Research Council of South Africa, as chief pathologist for subtropical crops. With the formation of Syngenta in 2001, Dr Smith was appointed South Africa's national crop specialist for sugar cane and all subtropical crops. It was also in this year that he obtained a PhD in plant pathology from the Free State University.

Prior to his appointment with Syngenta Australasia, Dr Smith held the position of product manager of seed treatment, turf and ornamentals for South Africa. In this role he was responsible for the newly-formed Professional Products Business Unit, incorporating seed treatment, turf, ornamentals, home and garden and professional pest management.

Since accepting this role in 2002, Dr Smith built Syngenta South Africa's turf business to one of the major market shareholders in 2004 and beyond. During this time he also developed a strong global network within the turf industry.

Dr Smith, who will move to Australia with his family, will be based at Syngenta's Sydney head office.

GCSAQ

As we are now into our silly season, it has been great to see some early season rains. The only problem has been that the storms which have produced this rain have also brought with them damaging winds and hail, with Helensvale and Arundel Hills golf clubs having hail the size of tennis balls shredding trees and causing a lot of pitch marks on greens.

Pressing issues in Queensland, like most other states, include water with the Department of Natural Resource and Mining releasing its draft water resource plan information report, and with this, meetings for different catchment areas around the state. These meetings have looked at draft resource plans for each catchment area. These meetings have been open to the public and any member of the public can apply to sit on planning committees.

The other big issue in Queensland at present is the Queensland Training and Employment Council's green paper that is looking at making the state's greenkeeping apprenticeship over just two years.

This is definitely not what industry wants and will be fighting tooth and nail to stop this from happening. We will be putting in a written submission and also be asking for a hearing to push our case to the council that it should be a four-year apprenticeship.

On the field day front, we recently held our annual turf research golf day which was very successful. Over 100 journeyed to Arundel Hills Golf Club and many thanks go to Jason Foster and to our sponsors for making this important day for our industry a success.

From this day, $5000 is donated to the turf research greens trial project at Redlands Research Station run through the AGCSA. Also a big thank you to the QGU for its contribution of $5000 towards this project. To the clubs that have contributed $1000 and who are also going to participate in this trial by having plots at their club, we thank you as well.

Our most recent field day was at Southport Golf Club in late November run by Country Club International . The day carried an environmental theme with representatives from Water Stax, Convault fuel storage systems, Enviromist chemical spray equipment and Terry Muir from Environmental Business Solutions all speaking about their products.

Our Christmas break-up is once again at Wet 'n' Wild on the Saturday, 3 December. This is a day to bring along your family and have a good time.

There have been a few movements around the state with Dean Henderson taking over as superintendent at Sanctuary Cove Golf Club, and Duncan Lamont, former assistant at Royal Pines, who has been appointed as superintendent at Gailes Golf Club. Congratulations to you both.

Until next year, good grass growing and have a Merry Christmas and a happy New Year.

ROD COOK,
PRESIDENT, GCSAQ.

TGAA NSW

Has the drought finally broken? The storms and rainfalls that have hit most of NSW recently are long overdue and hopefully we will receive a few follow-up deposits in the water catchment areas to boost our precious water supplies. I trust everyone has had a successful renovation season and I hope the weather was kind to you all.

On to the TGAA NSW scene, we are travelling great and as we speak are gearing up for our fourth Sportsman's Charity Fundraiser which is going to be big.

We are tipping the attendance to be around 450. We believe it is the biggest social event in the turf industry so drag yourself along now or plan for next year and see what you have been missing. Also coming up early in the New Year we have our annual golf day which will be held at Bexley Golf Club on 6 March, 2006.

The TGAA newsletter is expanding all the time and we are always looking for articles or topics of interest (however strange) that you think people should know about.

Also, just a short welcome and thank you to the recently appointed TGAA NSW committee; the coming years are going to be exciting. To all the industry sponsors, reps, members who have attended our days, thank you. You have all made the TGAA the success it is today. For further information on TGAA NSW visit www.tgaa.asn.au

Have a great festive season.

GRAEME LOGAN,
PRESIDENT, TGAA NSW.

TGAA ACT

The Christmas and New Year break is always a hectic time for all, and the TGAA ACT would like to wish everybody a Merry Christmas and happy New Year.

The mild spring and early summer was well received by everyone involved in the care and maintenance of turf areas throughout our area. Excellent rainfalls and cool temperatures have seen outstanding results post renovation. It is during this time that a comprehensive machinery maintenance and service schedule becomes essential due to the added workload.

The Canberra Institute of Technology's School of Horticulture in Weston will be running refresher/bridging classes covering level three Smartrain chemical uses. These certificates need to be updated every five years. Please contact Bruce Davies on (02) 6207 4623 for further information.

As all TGAA members know, part of the benefits of being a member is that you receive a quarterly newsletter. We at TGAA ACT wish to invite any submissions you may wish to include in our next edition. Please contact Gary Dawson on (02) 6207 4624 if you have a prospective article.

On a final note, for those not yet aware, it is with great regret to hear of the passing of Grant King.

Grant, or 'Kingy' as he was known by so many, was an industry icon whose imprint has been left firmly and permanently within the national trade. During his travels, his indelible mark was spread from the eastern states to as far West as you could go.

Along the way he influenced many people within the trade and took many of the younger generation under his wing. It was in Canberra and Queanbeyan where his presence was most felt. He was not just a greenkeeper; he was a course designer, trade spokesman, superintendent, leader, co-worker, and most of all, friend to many and mate to most.

Farewell old buddy; the place won't be the same without you.

Till next time agrostologists.

JUSTIN A K HASLAM,
COMMITTEE, TGAA ACT.

TGAA VIC

Hi to all TGAA (VIC) members and ATM readers. In August we held our second annual Celebrity Sports Luncheon, and with 170 people in attendance it was once again a great success. Our MC was legendary Victorian cricketer Darren Berry who kept everyone laughing with his exploits of the Victorian and Australian cricket teams and in particular some of the times spent with great mate Shane Warne. Darren then went on to interview guest speaker Tamsyn Lewis who gave a great insight into the life of a professional athlete.

Comedian Andrew Starton was hilarious with his impersonations of Sam Newman, Bruce McAvaney, Mike Sheahan, Richie Benaud and even Sir Donald Bradman.

We are looking at possibly making a few changes to the event for next year, which may include holding it during the evening to allow more people to attend. If you have any ideas for functions or additions to any of our current days that we hold, please do not hesitate to call one of the committee members. We can all be found at www.tgaa.asn.au.

Our next and last function for the year will be held in Geelong on Wednesday, 7 December. The day will involve a tour of the Anco turf farm at Torquay, where we will look at their new varieties Conquest couch, Sea Isle paspalum and Sapphire soft-leaf Buffalo.

From there we will travel to the Geelong Botanic Gardens where curator John Arnott will lead us on a tour which will take in their fabulous 21st Century garden. We will then travel to Geelong Grammar School where Turfcare and Hire will demonstrate one of Anco's new inline planters. Preceding that will be a tour of the school grounds where we will look at new some turf which is on trial.

It promises to be a very relaxing but educational day and as a new member to the committee I am looking forward to hosting the day and meeting with new colleagues.

Next year promises to be an exciting one with some new ideas on the horizon for the association. Until then, have a safe and happy Christmas. See you next year

MATT HANRAHAN,
COMMITTEE TGAA VIC.

TGAA VIC

GCSAWA

With summer now upon us, most turf mangers in Western Australia would be grateful just to have some warm spring weather to heat up the soil and finally kick the warm-season grasses into action. At the time of writing, Perth had experienced just one day of +28ºC weather and steady light rain typically a couple of times a week. Our dams are at 41 per cent, equating to 285Gl, which is up some 37Gl on the same period last year.

The GCSAWA has again had a busy period with the conclusion of the 2005 Golf Masters Cup competition which has been greatly supported by host clubs, members and the very supportive trade sponsors. I would like to thank all of them for making this year's events truly outstanding and we look forward to their support at next year's days.

The overall winner was Andrew Fortune from Royal Fremantle Golf Club with 84 points, while runner-up was Dixie Joy from Christchurch Grammar on 81 points.

Plans are underway for the 2006 Margaret River Conference to be unofficially held in August. This will allow WA members to enjoy both the AGCSA conference in Brisbane in July followed reasonably closely by our biennial state event which, even in the early planning stages, looks to be a memorable couple of days in the beautiful southwest.

A meeting was held at the start of November with members of the Secretary Managers Association of WA to discuss the significant loss of skilled staff from the golf industry, as well as associated problems of attracting replacement staff into positions that offer poor wages and conditions.

A wage cost analysis between various local government EBA's and our Award was presented to the general managers, and was, to say the least, quite a shock but well received. This issue relates directly to important groundspeople and tradespeople and not specifically superintendents or assistants.

Local government and contract turf maintenance operations, along with other non-horticulture industries, are offering far improved remuneration packages and quite rightly lure our high quality staff away from what used to be a lucrative and progressive golf market.

To highlight the extensive gap, a new groundsperson with no experience under an EBA can earn 24 per cent more than an Award employee of the same employment status. In some cases, first-time employees under EBA's can earn more than the prescribed base tradesperson rate under the golf Award. This is true of course only if you are forced to adhere to the Award or have staff still willing to work for Award wages. (Award groundsperson @ $25,282pa vs EBA groundsperson @ $31,808.)

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. 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 long-lasting measurable impacts on your club's success.

Club boards 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 reducing existing expenditure, they must not ignore or disregard the importance of having happy, productive staff that work tirelessly to provide them with the high quality product in the first place. All groundstaff have tremendous worth and perform equally as important jobs within their workplace and we should not allow any employment position to be devalued or understated for the sake of improved trading results.

Some clubs have already addressed the issue and implemented strategies to ensure they secure their labour force for the future. We hope through further education 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. Pay reasonable fair wages or continue to be a revolving door workplace.

BRAD SOFIELD,
PRESIDENT, GCSAWA.

GCSAWA ▶

TGAA WA

The issue of recycling treated wastewater is in the public spotlight here in WA with the state government announcing that it will fund an investigation into using treated wastewater to recharge depleted aquifers in the Perth region. There is currently over 100 gigalitres per year of treated wastewater pumped into the ocean off Perth.

Our association advocates the re-use of treated wastewater on turf to take the pressure off groundwater supplies. TGAA (WA) member John Forrest from Challenger TAFE has recently completed a research project into the re-use of treated wastewater on turf.

The association has sponsored John to attend the 20th Annual Water Reuse Symposium in Denver, Colorado to present the findings of his project, 'Monitoring the Irrigation on Sandy Soils with Treated Effluent Water in Western Australia.'

Another local turf research project currently underway is a three-year study into the management of kikuyu in the Perth region, at the University of Western Australia (UWA).

TGAA (WA) is contributing funds towards the project because it is important research for our local turf industry and the findings will be relevant to most of our members.

The renovation treatments were carried out in November, and UWA will be holding an open day at the Shenton Park field site in December for anyone involved in the turf industry to inspect the progress of the trial.

Our final event for the year was the TGAA (WA) Social at the ING Cup day-night cricket match at the WACA, between the Western Warriors and Tasmanian Tigers. This event was a combined sponsors appreciation and Christmas function and it provided a great opportunity for our members to network and interact in a social atmosphere.

The WACA provides great support to the TGAA WA and I'd like to thank them for hosting the event and helping to make it a success.

PETER RUSCOE, PRESIDENT, TGAA WA.

NSWGCSA

The rain has come at last! Parts of NSW and Sydney have had some reasonable to good rains during spring. This followed some winter rain with the drought declared area of NSW dropping from 77 per cent to 38 per cent. Hopefully it will be a wet summer. Unfortunately, the rains haven't done much for the Sydney catchments with Level 4 restrictions still in full force.

BOARD CHANGES

Shaun Probert, the recently appointed superintendent at Ryde Parramatta Golf Club, has joined the NSWGCSA Board. Shaun was superintendent at Camden Lakeside prior to his move to Ryde Parramatta. Shaun has also recently completed a Masters degree.

PENNANT HILLS EDUCATION DAY

Around 80 attendees enjoyed the hospitality at Pennant Hills Golf Club for our annual education day including several general managers and club board members. The topic this year was 'Better Management' with superintendents invited to bring someone from their club board or management.

Daryl Sellar (superintendent Glenelg Golf Club) gave an excellent presentation on the responsibilities of today's superintendent as well as the vital aspects to utilise in managing them. He also presented the method of planning used at Glenelg to address major issues at the club and develop a strategic plan to upgrade the course and other infrastructure.

David Scaife (superintendent Bonnie Doon Golf Club) provided an interesting presentation on the priorities and use of labour across the course from records kept with Trims software.

AGCSATech manager John Neylan gave a fantastic presentation on cost vs quality which was a real eye-opener for the general managers and club board members present. John raised many questions including our desire to continually improve our courses and raise standards and whether it is sustainable.

One take-home goal was to develop a maintenance philosophy with club management which has an agreed standard or benchmark that is affordable and sustainable. Often superintendents are expected to lift standards or maintain them with less expenditure.

If club management has an understanding of the costs and labour involved in maintaining each area of the course they are then more able to relate to the priorities set by the superintendent.

A panel including the above speakers and John Odell and Mark Parker discussed issues of contract maintenance and other management issues. Peter Watts (Terrey Hills), Richard Kirkby (Pennant Hills) and Dave Warwick (Avondale) gave an entertaining and informative presentation on the respective experiences on US study tours, including the conference. Many thanks to sponsors Nuturf and Country Club International, as well as Pennant Hills Golf Club for the day.

DEC

A meeting was held with the NSW Department of Environment and Conservation and the AGCSA regarding the environmental management system (EMS) being developed. The AGCSA has been working on the system with Terry Muir for release early next year.

All golf clubs will be encouraged to join the program with support from the relative state and national golf associations being sought to encourage the system's implementation through club management. Workshops, online and phone support will be set up to help superintendents or the environmental officer at each club through the EMS. The DEC is likely to support the program and is keen to see it reach every club in NSW.

EDUCATION

The NSWGCSA board recently met at Ryde TAFE with an inspection of facilities and meeting with head teacher Frank Dempsey. Issues of funding, student numbers, and student and teacher quality were discussed. Frank managed to overcome a push to have student to teacher ratios doubled and managed to maintain the 15:1 ratio.

COMING EVENTS

The annual Christmas harbour cruise is planned for 7 December and is sure to be another great day. A registration form has been sent to members via email and one can also be downloaded from the AGCSA website.

The date and venue for the DEC workshop to release the self-audit and EMP is yet to be announced. The association has managed to secure NSW Golf Club for our annual Rube Walkerden day in May. Thanks to Gary Dempsey and the NSW Golf Club for making this possible.

MICHAEL BRADBERY, PRESIDENT, NSWGCSA.

NZGCSA

Greetings once again from across the Ditch. It is hard to believe we are very near to the end of the year. I find it's a good time to reflect on achievements and start redefining goals for next year.

Since the last NZGCSA update we have had a few things happen in New Zealand worth noting. Recently the industry was rocked by the untimely death of Wayne Glasgow, long-serving superintendent at Onewhero Golf Club about an hour south of Auckland. Wayne's death tragically occurred at work and on behalf of every superintendent in New Zealand I offer Wayne's wife and family our deepest condolences.

Wayne had been with the club for 30 years and had been a big supporter of the Auckland Golf Course Superintendents' Association (AGCSA), serving as secretary for a time. Wayne was a regular supporter of regional training days and was a frequent attendee at national conferences and always sought to further his knowledge.

I played at Onewhero as a junior and was always impressed by the standard of the presentation of the course. Onewhero is considered one of the better courses outside the metropolitan areas which was a testament to Wayne's skill as a superintendent.

I was fortunate to recently attend the Auckland GCSA annual awards evening. It would be fair to say the night was a great success and thoroughly enjoyed by all those that attended. We all work in a 'tall poppy environment' so to be recognised by your peers at events such as this has to be the ultimate compliment.

There were three awards presented on the night, the first being the AGCSA Trainee of the Year Award. This went to Chris Biddick from the Formosa Country Club.

The second award presented was the David Baskett Memorial Award, which recognises outstanding service in the local golf turf industry by a superintendent. This year's worthy winner was Richard Warren from Remuera Golf Club. Richard has been superintendent at Remuera for close to 25 years and has been involved heavily at both regional and national level. To say he is passionate about the golf turf industry would be an understatement.

Peter Barwell from Advance Irrigation was the recipient of the AGCSA Associate Member Award. Peter's knowledge of all things irrigation and his commitment to the industry in New Zealand is beyond reproach. To me he is one of the real characters of our industry in New Zealand.

Finally, on behalf of the NZGCSA executive, I want to wish all in New Zealand and Australia a very Merry Christmas and a happy New Year. Please be safe if you are travelling and please do the right thing if you've had a few when it's time to go home. Let a sober driver get you there.

BRETT BURGESS,
PRESIDENT, NZGCSA.

VGCSA

Box Hill Golf Club will host the VGCSA's final meeting for 2006

The VGCSA's last general meeting was held at Growling Frog Golf Course, with over 70 heading north of Melbourne to the recently opened Graham Marsh course at Yan Yean.

We were welcomed by Neil Hocking from the City of Whittlesea who gave us some background on how and why the course came about. Rod Binedell from McMahons gave us a thorough look into construction methods using GPS technology. I think we had all heard of this new technology but did not fully understand how it worked or how accurate it can be. This is a tool I am sure we will all use in the future whether it is for large or small construction/reconstruction.

Host superintendent Wayne Dale then took us on probably the longest course inspection walk where we just about covered most areas on the course. It was much appreciated Wayne, and the course was in fantastic condition – not a bad job for an old surfboard shaper!

Bill Stephens and his crew from Ag Power (Jacobsen) gave us a look into some new and interesting pieces of equipment. We thank Bill for his time and we should all think about having a demo of these machines at these meetings as it can save all parties some valuable time.

We had just over 40 stay for golf after a fantastic lunch. By that stage the wind had picked up and we were seeing the true test that this undulating, links-type golf course could present.

While starting the groups I witnessed some great golf, but no better drive than that of Colin Foster with his new stick and the natural ability of ATM editor Brett Robinson. ***(Shame about the rest of the round – Ed)***

A special thanks to all at Growling Frog. The course was in great condition and the catering for breakfast and lunch was sensational. Thanks also to Wayne Dale for his assistance in organising a great meeting.

UPCOMING MEETINGS

The final VGCSA meeting of the year will be on 12 December at the Sandhurst Golf Club (superintendent Chris Grumelart).

Looking ahead to 2006, the following dates should be pencilled in:

Monday, 20 February – Sorrento
Sunday, 26 and Monday, 27 March – Barnbougle Dunes (Tasmania)
Wednesday, 17 May – Victoria
Monday, 14 August – Spring Valley
Tuesday, 3 October – Torquay Sands
Tuesday 28, November – Box Hill

As requested by popular demand from our members, we have organised a meeting next year in Tasmania. This day will be held at the spectacular Barnbougle Dunes and sponsored by Globe Australia. As soon as we have finalised details we will forward them to all members.

The format will probably be as follows: Fly to Launceston Sunday morning; golf at Barnbougle Dunes Sunday afternoon followed by dinner (pay as you go); accommodation at Barnbougle Dunes or nearby Bridport Resort; general meeting Monday morning; depart Monday afternoon.

The cost will be about $300 and covers all flights, bus to Barnbougle, golf, breakfast and lunch on Monday. The first 40 to book will stay at Barnbougle and the remainder at Bridport resort. Total numbers will be limited to about 80.

NEW VGCSA MEMBERS

The VGCSA is pleased to welcome the following members to the association: Brendan Murphy (Warracknabeal Golf Club), Steven Burchett (Portarlington Golf Club), Aaron Miller (Howlong Golf Club), Ian Todd (Victoria Golf Club) and Tim Magee (Metroturf Machinery).

Enjoy your summer and to all those superintendents hosting tournaments, all the best with preparations. On behalf of the VGCSA committee I wish you a merry Christmas and a happy New Year.

MARK PROSSER, PRESIDENT, VGCSA.

VGA

Many things are discussed at VGA committee meetings and at one of our recent meetings Grant Weir, the participation and development manager at Bowls Australia, dropped by.

Grant gave an interesting talk on how the national body was keen to become involved in not only our association but other bowling greenkeeping associations around the country.

He explained he was keen to see how the VGA and other associations conducted themselves and even mentioned sponsorship in some capacity.

Speaking of sponsorship, the VGA is working on packages which are nearly finalised. The packages will be Gold, Silver and Bronze with full-page, half-page and quarter-page advertisements in our magazine.

Other things on the agenda include the warm-season grass trials at NMIT Fairfield Campus and our conference week in Echuca-Moama which involves sponsored bowls days, guest speakers and golf among other things.

BILL HAMSHERE, COMMITTEE, VGA.

SAGCSA

If climate change was something we only heard about on TV or talkback radio, then we had better strap ourselves in considering what we have experienced in South Australia during October and November. There have been some crazy trends in the weather so far this year with an extreme dry spell at the start of 2005 seeing fire bans and bushfires well into May-June. Good rains fell during winter then all hell breaks loose in October and November with double the monthly averages. November's came in less than 48 hours! Oh well, all in a year's work for superintendents and their crews.

The SAGCSA's October country meeting was held at Naracoorte Golf Club (host superintendent Paul Clark). For those hardy souls who made the trip I am sure it was an eye-opening experience. Paul took us on a course inspection and being an old Naracoorte boy myself I know the history of the greens.

It is an absolute credit to Paul's skill as course superintendent to produce greens which were basically *Poa* free. The Naracoorte members can justifiably shout the old line of "the greens have never been better". All this on a limited budget with 1.6 staff, is a lesson on greenkeeping fundamentals at its best.

With irrigation water at a constant 1800ppm, infrequent deep watering, a good aeration program with a balanced nutrition program, this has allowed the bents in the greens to totally dominate the surfaces.

With Christmas just around the corner I pass on season greetings to all involved in the turf industry. With all that Mother Nature has dealt up to superintendents in 2005, who knows what lies ahead in 2006. One thing is for sure – it will be a change from this past year.

PETER HARFIELD,
PRESIDENT, SAGCSA.

LOWARA

At StrathAyrs 400 acre turf nursery we were looking for a pump system that could meet all of our irrigation requirements from running a 3" set line with sprinklers to up to five travelling irrigators. We chose the Lowara/ Hydrovar pump system because of its flexibility, and potential cost savings.

We are entirely satisfied with the system which is so easy to use. The service from Brown Brothers was a major factor in purchasing the pumpset and " I would recommend them to anyone"

Jason O'Brien
Farm Manager
StrathAyr Turf Nursery

What is a Hydrovar?

Hydrovar has gained a reputation as the pump mounted, microprocessor pumping system controller. But it does much more than just change motor speed.

It actually manages the performance of the pump to match a wide range of system conditions and requirements.

Hydrovar is fully programmable on site as it incorporates the microprocessor and the variable speed drive in one compact and unique package.

How the Hydrovar reduces maintenance cost.

Hydrovar software is designed specifically for centrifugal pump operation, control and protection. Hydrovar can thus be setup to protect the pump from operating under various unfavourable conditions eg. cavitation, operating against closed head, low NPSHa or operation past a pumps maximum flow rate. Hydrovar will automatically shut down and alarm if adverse conditions occur.

Hydrovar provides the Turf Nursery Manager with the flexibility of watering required with substantial savings on installation, power usage and maintenance. For more information about the Hydrovar and how it can benefit you please contact the Lowara distributor nearest to you.

How the Hydrovar reduces energy consumption.

Most applications involve the pump operating either along its full speed performance curve or the pumps performance is throttled or regulated by a valve. The Hydrovar eliminates these operating methods by regulating pump speed and hence output to match the system demand. This saves wasted energy traditionally lost in these conventional pump systems. Energy savings of up to 70% can be realized. (figure 1)

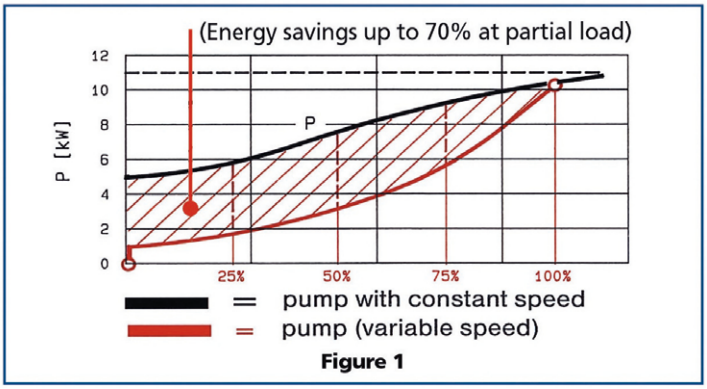

Figure 1

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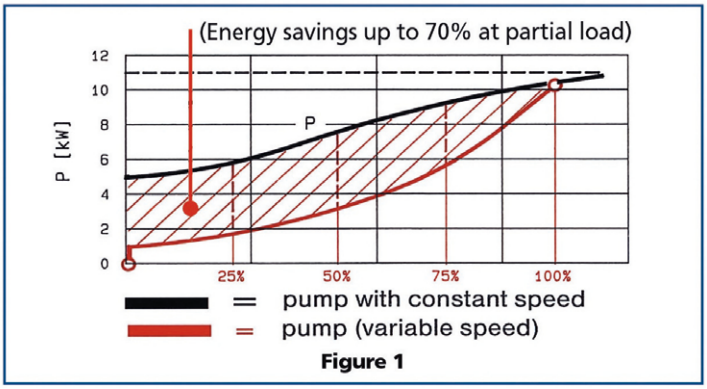

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