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Turfgrass
MANAGEMENT

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A time to shine

volume 25

OCTOBER - NOVEMBER 2000

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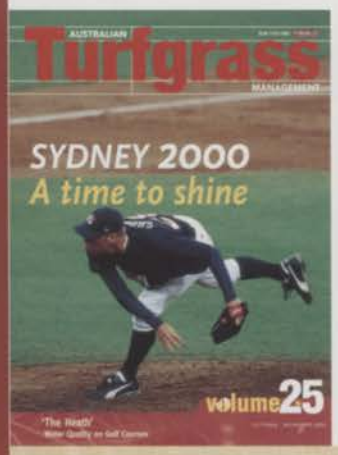
USA took gold in their clash against Cuba in the Baseball Final at the Showground Stadium.

PHOTO: Delly Carr, Sportshoot.



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Special!

Just ten days out from the Sydney Olympic Games, I was fortunate enough to visit a number of the Games venues. Some were going through final preparations and putting on the finishing touches, others were just beginning major reconstructions with a mountain of work to get through in a ridiculously short time frame. From four meters away (the distance from my couch to the TV), the results spoke for themselves and those involved should be congratulated.

In this edition we follow the preparation and construction of a number of these venues. It makes for interesting reading and some of the shots are quite spectacular. We also go out to "The Heath" to catch up on the great work that Martin Greenwood and his staff have been doing in preparation for the 2000 Holden Australian Open and Martin Breen from the Moonee Valley Racing Club discusses how they are getting ready for their big day.

In RESEARCH, Andrew McNitt from the Penn State University investigates the effect that various soil inclusions have on the playing surface quality of athletics fields and Jyri Kaapro delivers the final results of a water quality survey done at 44 golf courses in NSW.

Daryl Sellar reviews a new book on bentgrass management and on page 40, we have an article that discusses what's available, what to look for and what's on the horizon as far as turf-spraying equipment is concerned.

In REVIEW, we publish the speech that Peter McMaugh delivered in accepting the 2000 AGCSA Distinguished Service Award at the Millennium Conference in Melbourne. It's full of 'McMaughisms' and serves as an entertaining and interesting commentary on the industry and I hope you enjoy it.

Phil George
Editor

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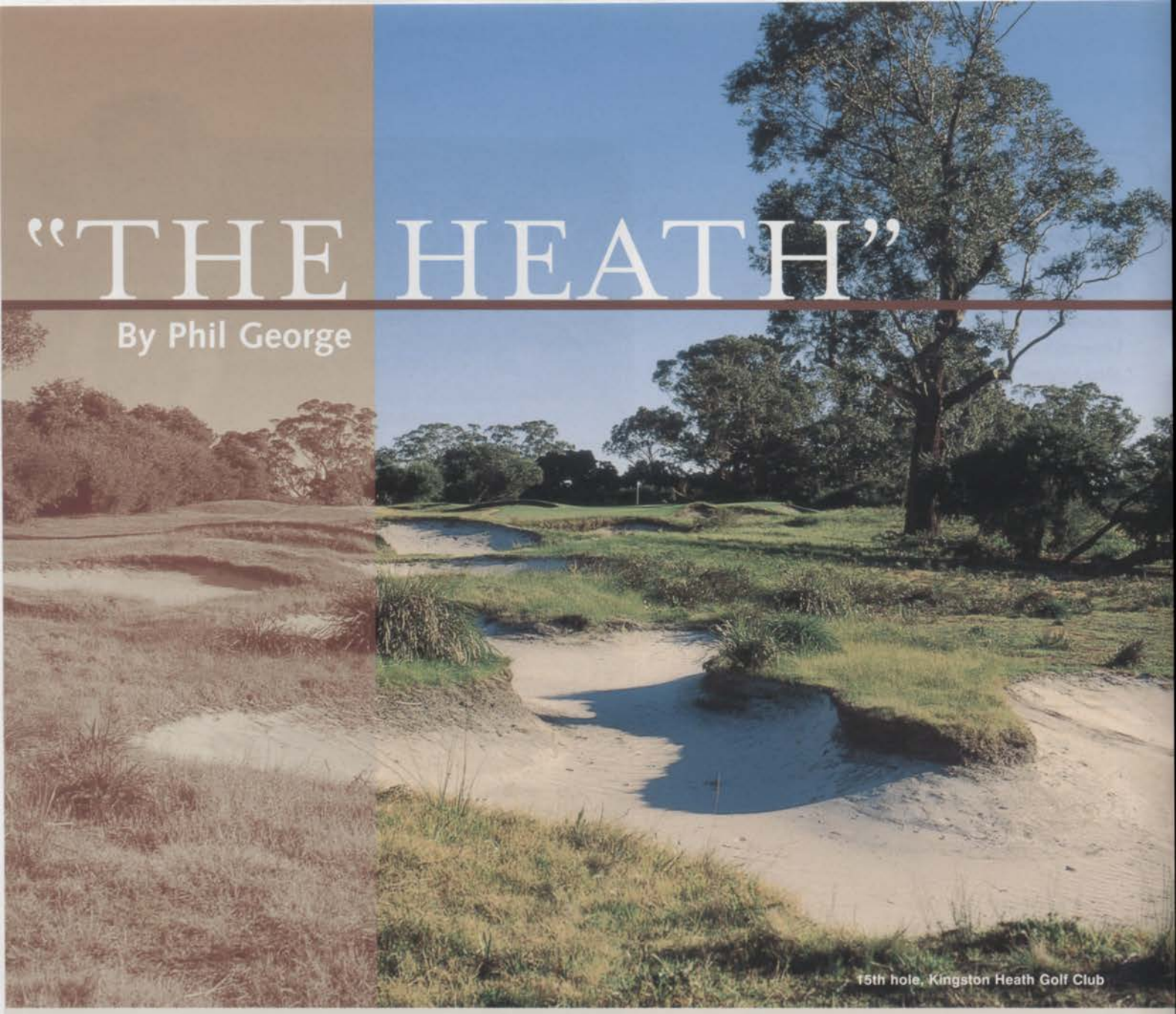
"THE HEATH"

By Phil George



15th hole, Kingston Heath Golf Club

Considered by many as Victoria's finest golf course, the Holden Australian Open is a regular visitor to the heavily bunkered fairways of the Kingston Heath Golf Club.

However, this year, Course Superintendent Martin Greenwood will be in the drivers seat for this his first Open preparation as Superintendent. Beginning his career at the Sale Golf Club Martin worked as assistant to John Sloan at Woodlands for five years then spent 8 months at Kingston Heath in the lead up to the 1989 Australian Open. Following a stint at Gainsborough Greens G. C. in Queensland, Martin spent the next five years working in Asia. He returned to take up a senior position on the Sanctuary Lakes project and after 18 months was given an opportunity to returned to "The Heath" as Superintendent with the 2000 Holden Australian Open on the horizon.

Preparation for the event started straight way with construction of a new practice fairway on eight hectares of land purchased from the State Government in late 1999. Bulk earthworks and shaping had the area ready for planting by December. Half of the practice fairway was planted using a plug planter and the other half was done by spreading stolons by hand and by using a 'muck spreader'. The stolons were then rotary hoed into the soil and watered heavily until established. Santa ana couchgrass was used on the fairway and Winter Green was stolonized on the 4000m² tee area. Oxidiazon (Ronstar) was applied at label rates for pre-emergent weed control with excellent results and the fairway received its first cut in late February. The practice fairway is on schedule to be opened one month prior to the tournament and will give the club much greater flexibility as the old practice fairway can now be used to hold tournament infrastructure.

In addition to major works on the new practice fairway, the 12th tee has been reconstructed to lengthen the hole by 48m. Extensive drainage and irrigation work was required, and with the assistance of Mike Clayton, the existing fairway bunker was moved back and positioned 264m out from the championship tee. This project was completed in early April.

Completed in May this year were modifications to 'mounds' and 'rough carries' on holes 13 and 14. On the 13th, the

Tee tops, surrounds and high wear areas on fairways were Verti-drained in September.

common couch in the rough carry was removed and sown with "Kingston Heath Mix" (45% Sheep Fescue, 45% Hard Fescue, 10% Vic Bent). On the 14th hole, 2000m³ of soil from the new practice fairway was used to build up a low area in front of the tee. New drainage was installed and as with the 13th, the new area was grassed with the fescue and bentgrass mix. It has been a good season for cool season grass and the results were excellent.

Last summer, in preparation for the open, the fairways were savagely de-thatched using a T&I TR50 and a Toro 450D Fairway Mower modified with verti-mowers. The fairways were cleaned using a vacuum borrowed from Graeme Rogers at the Capital G. C. which removed approximately 800m³ of material. The de-thatching seemed to help with the prevention of Spring Dead Spot during winter and the fairways are clearly much firmer under foot. Although the couch hardly stopped growing this year, a slow release fertiliser was applied in March to push growth through the winter and to help it sprint out of the blocks in early spring.

In addition to the extensive works completed on turfed areas, a massive amount of tree work has been done in preparation for the tournament. IMG have sent out their "rope man" who assesses where the crowds will be and marks areas (in the case of Kingston Heath, Tee-Tree), that needs to be cut back. One month before the tournament OH&S will be out with an arborist to check trees for safety and Channel Seven have also been over the course to make sure their crane trucks have access to where they want them. Given the 'scaring' that results from this type of work, Martin commented that in hind sight its is something he should have done 12 months ago.

'Routine type' preparation for the tournament began once some movement in the couch was observed.

In early September the greens were cored using half inch tines set to a depth of 2½ to 3 inches and fertiliser was applied based on soil test information and recommendations made by US Turf Consultant, Tom Parent.

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Martin adopts a basic approach to fertilising so at renovation a 'starter' fertiliser was applied as a 'nutrient base' at 2kg/100m^2 and to boost the magnesium content Mg_2SO_4 was applied at 0.5-1.0kg/100m^2. From now until the start of the tournament, a generic trace element mix will be applied every 6-8 weeks. Although diseases do not tend to cause significant turf damage, the Egmont putting surfaces have been on a preventative program where fungicides have been used monthly since October.

During September, all walk-on and walk-off areas around greens as well as tee tops and high wear areas on fairways and bunker edges were verti-drained. In the first of three applications spaced six weeks apart, a wetting agent was applied to all fairways. At the end of September, the collars and approaches were cored and were also treated with a wetting agent. Another two applications spaced four weeks apart were made.

African Black Beetle (Heteronychus arator) can cause significant damage to fairways at Kingston Heath but an application of Imidacloprid (Merit) made to all fairways in September has kept them well under control.

In an effort to have the fairways (Winter Green, Santa ana and Common couch) in the best possible condition, a "quick release" fertiliser with the analysis (12:2.6:13.2 + 3% iron) has just been applied. Later this month (October), a slow release fertiliser with the analysis (22:1.5:11) will be applied to have the fairways peaking during the tournament (November 23rd – 26th).

Preparation of the roughs has posed the greatest challenge.

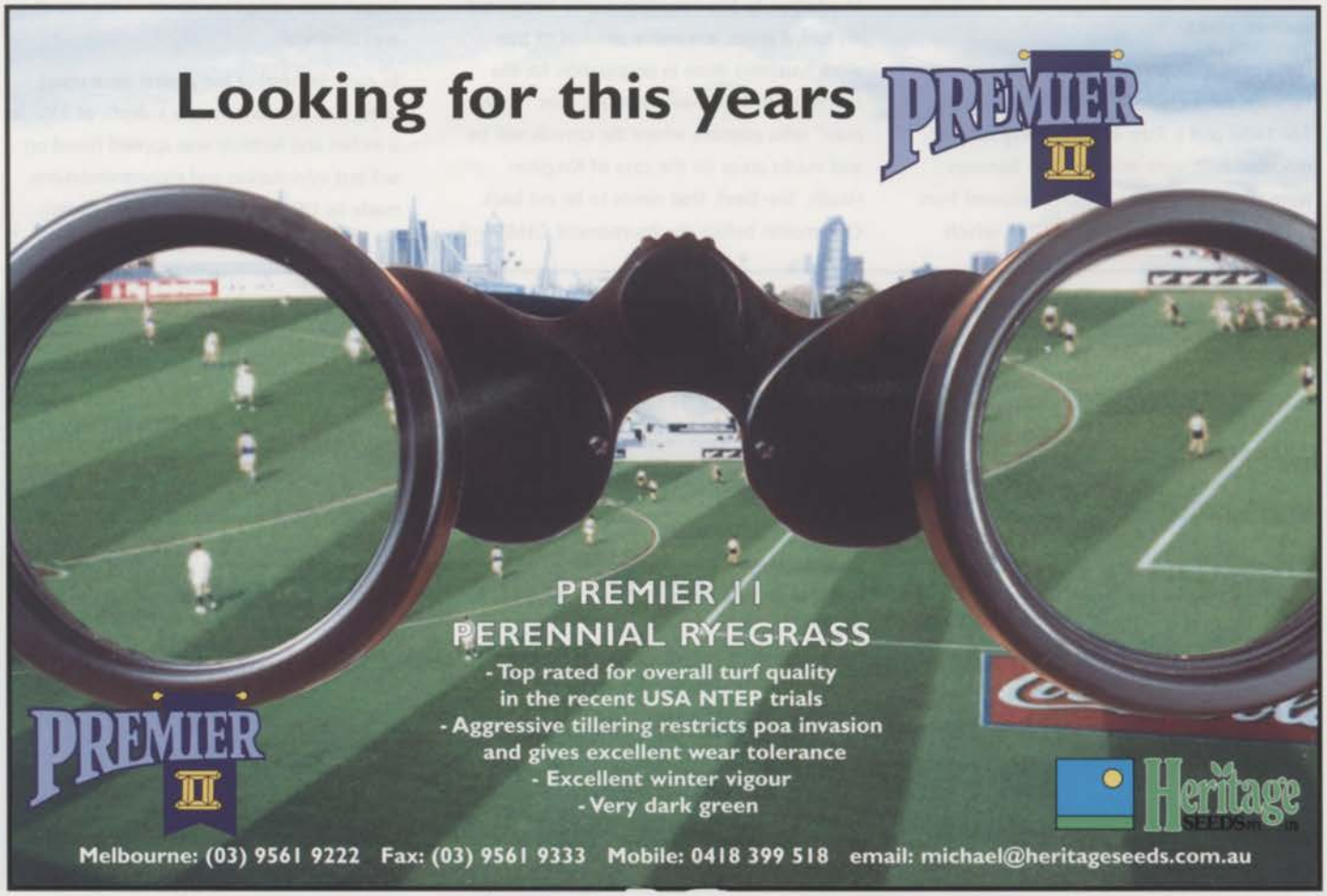
To give the rough enough "teeth" the Australian Golf Union (AGU) require four inches of rough. To achieve this in Melbourne by November on a course where the Common couch is easily damaged by frost and where many rough areas are trafficked by machinery, is extremely difficult.

A plant growth hormone "Gibberellic Acid" and a starter fertiliser was applied to the rough in an attempt to get them moving in August but it was without success. Better results were achieved in October once longer day length and higher soil temperatures had woken the couch from its slumber. Since then the roughs have been pushed with applications of a liquid fertiliser every two weeks and the results have been as good as could be expected.

Martin plans to have the greens at a height of 2 1/2 - 3mm and rolling at 11 feet from the 'Stimp Meter' but these targets are not set in stone and they will be monitored daily. In an effort to have the greens as healthy as possible they will be treated lightly for as long as possible but by tournament week they will be double cut twice per day using walk behind mowers and will be rolled every morning.

To 'tighten-up' the fairways, Trinexapac Ethyl (Primo) will be applied three to four weeks prior to tournament week and they will be double cut at a height of approximately 8mm.

Without doubt, the years of planning and hard work will culminate in a career highlight for Martin, his assistant Bob Simmons and their dedicated staff of 14. The course looks ready to go tomorrow and we wish them well.



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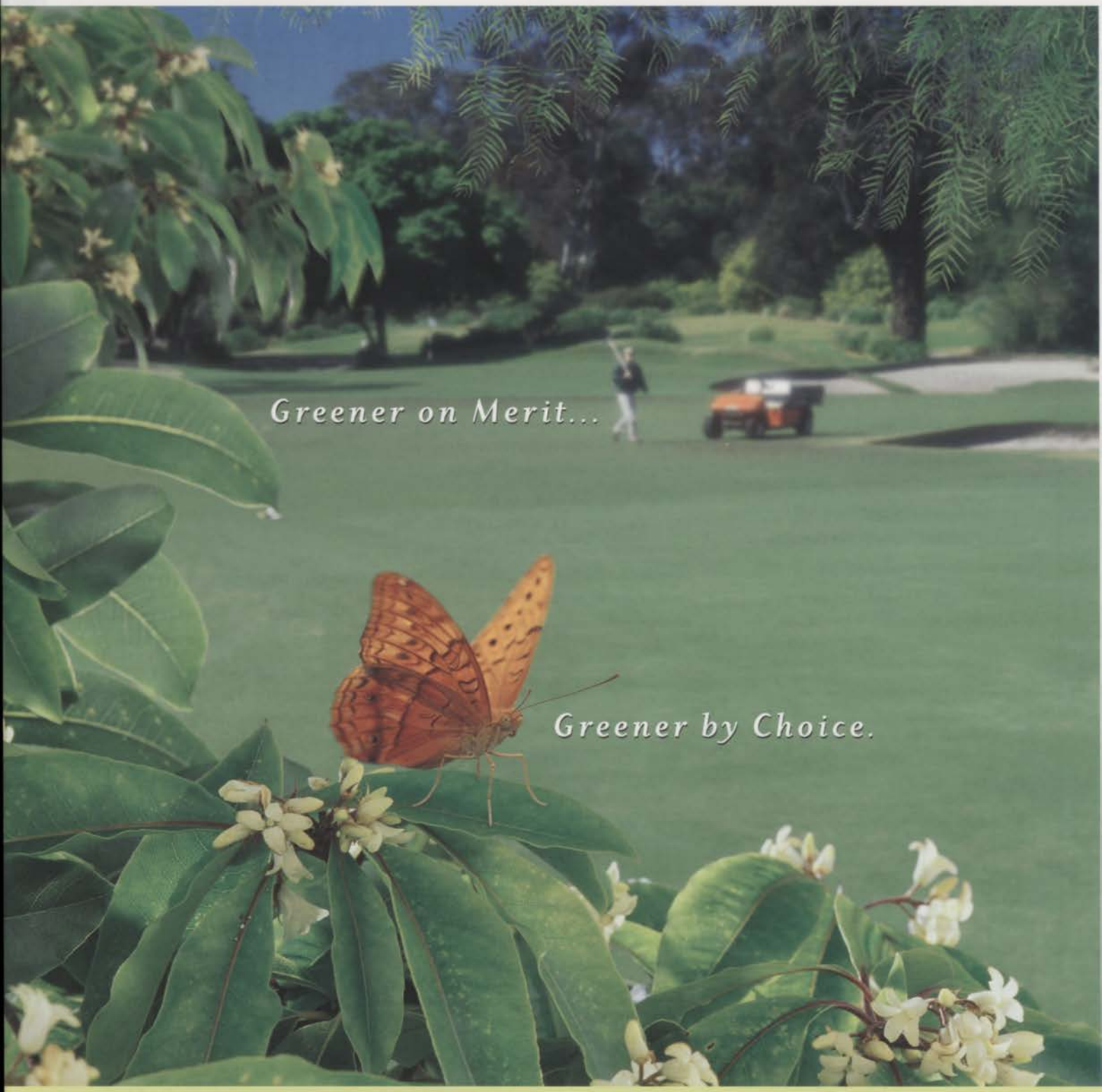

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BY TIM COLMER

SALT tolerance in plants

Soil salinity is one of the world's most serious environmental problems. Salinisation of land and water resources in southern-Australia has diminished agricultural production in some areas (eg. WA Wheatbelt) and compromised water quality for irrigation and drinking (eg. Murray-Darling Basin). Likewise, an increasing number of turf managers have to deal with salinity. The article by Lee, Duncan & Carrow (Vol 2.3, pp. 30-32) summarised some of the causes of this trend facing turf managers, and discussed the importance of developing salt-tolerant turf genotypes. An overview of why salinity impedes plant growth and key mechanisms of salt tolerance in plants are summarised in this article.

DEFINITION OF SALINE AND SODIC SOILS

The US Salinity Laboratory in Riverside, California, defined saline soils as those soils having a saturated extract with an electrical conductivity (ECextract) higher than 4 dS m-1. Often, the salt responsible is predominately sodium chloride (NaCl), however other salts such as those of magnesium (Mg) and calcium (Ca) can also contribute to the EC of saline soils. Four dS m-1 (a level less than 1/13th of the EC in seawater) was chosen as the threshold level since at this salinity the growth of many salt-sensitive crops is reduced.

The term sodic soil applies to those soils in which the ECextract is less than 4 dS m-1, but the exchangeable sodium percentage (ESP) exceeds 15. The extent of sodium adsorption in soils depends on the proportion of the monovalent (ie. one positive charge) Na+ cation to the multivalent cations (especially Mg^{2+} and Ca^{2+}) and is expressed as the sodium adsorption ratio (SAR) defined as:

SAR = [Na] / ([Ca] + [Mg])0.5

where [ion] are the concentrations in soil solutions or 1:5 soil:water extracts.

This chemical condition of high sodium relative to the divalent cations causes dispersion of clay particles in soils which in turn results in poor soil structure with low water and air permeability. These factors impede plant growth. One management option is to apply gypsum ($CaSO_4$) to decrease the SAR and improve the formation of soil aggregates.

PLANT RESPONSES TO SALINITY

High concentrations of salts dissolved in soil water can inhibit plant growth because:

(i) The salts decrease osmotic potential of the soil solution (ie. ΨSOLUTE becomes more negative), reducing the gradient for water uptake by roots (see TECHTALK Vol 1.6).

(ii) Excess Na^+ and Cl^- in plant tissues are toxic since these ions disrupt the structure and function of enzymes. Furthermore, high soil Na^+ can inhibit uptake of K^+ and high Na^+:K^+ ratio in tissues further inhibits enzyme functioning.

Symptoms of salt damage are; reduced growth, tip burn of leaves, and wilting. High salinity can itself cause plants to die, and salinity in combination with other factors such as poor root-zone aeration (eg. waterlogging) or high temperatures, can result in rapid death of most plants. The severity of growth reductions and symptoms of leaf damage

SPECIES	TOLERANCE RATING*
Cool-season turf types	
Colonial bentgrass (Agrostis tenuis)	S
Creeping bentgrass (Agrostis palustris)	MS
Perennial Ryegrass (Lolium perenne)	MT
Tall Fescue (Festuca arundinacea)	MT
Warm-season turf types	
Zoysiagrass (Zoysia spp.)	MT
Couch (Cynodon spp.)	T
Seashore paspalum (Paspalum vaginatum)	T

◄ **Table 1. Relative tolerance to salinity in some turf species.**
Taken from Harivandi, Butler & Wu (1992). Salinity and Turfgrass Culture (In: Turfgrass. American Society of Agromomy Series, Vol. 32. Waddinton, Carrow & Shearman, Eds).
***The ratings, based on soil ECextract of: sensitive (S) = < 3 dSm-1; moderately sensitive (MS) = 3-6 dS m-1; moderately tolerant (MT) = 6-10 dS m-1; tolerant (T) > 10 dS m-1, reflect the general difficulty in establishment and maintenance at various salinity levels. Grasses may be able to tolerate higher levels under optimal management.**

Salt crusting on the surface can be observed in severe cases.

become more severe with time of exposure to saline conditions.

That plant species differ markedly in salt tolerance is clearly evident from the observation that some fruit trees (eg. Avocado) suffer severe damage even when irrigated with only slightly saline water, whereas coastal mangroves grow in sea water! Turf species also differ in salt tolerance (Table 1); although all of the species in table 1 are much less tolerant than salt-marsh plants. Other studies, including that of Lee, Duncan & Carrow (Vol 2.3, pp. 30-32) show:

(i) considerable variation in salt tolerance among cultivars/selections within a turf species, and

(ii) the high degree of salt tolerance in some saltwater couch (Paspalum vaginatum) genotypes.

Salt tolerance is largely determined by physiological mechanisms that:

(i) Limit the rate of Na^+ and Cl^- accumulation in leaf tissues, predominately controlled by ion exclusion at the roots. (In addition, some very salt tolerant plants also have specialised glands on the leaf surface to excrete salts). Ions that do enter the shoot must be sequestered into vacuoles to protect the enzymes in the cytosol from being disrupted.

(ii) Maintain selective uptake of essential nutrients, especially K^+, despite the low external ratio of K^+:Na^+ in the soil. Control of selective ion uptake was discussed in TECHTALK Vol 2.4.

(iii) Enable osmotic adjustment by the plant (ie. an increase in the total solute concentration in the cells) so as to maintain a favourable gradient in water potential ($\Psi ROOT < \Psi SOIL$) for absorption of water by the plant (see TECHTALK Vol 1.6). The solutes accumulated can either be ions taken up from the soil or small organic solutes synthesised by the plant.

Salt tolerant plants have a high degree of expression of all of these mechanisms, whereas salt sensitive genotypes may not be efficient in one or more of these physiological processes.

MANAGEMENT IMPLICATIONS

Diagnosis of a potential salinity problem can be resolved via chemical analyses of irrigation water, soil samples, and/or leaf tissues. Appropriate soil tests will also reveal any sodicity problem. Practices such as application of gypsum to sodic soils and periodic leaching of salts from the soil profile to prevent build up are often recommended as management practices. However, leaching of salts (and

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presumably also nutrients) from the root zone can contribute to off-site pollution, so the sustainability of this as a management option is questionable. The use of salt tolerant genotypes should enhance culture of quality turf in salt-affected areas.

Dr. Tim Colmer is a lecturer in Plant Sciences at the University of Western Australia. Dr. Colmer co-ordinates the Turfgrass Research at UWA, a program in collaboration with industry.

NOTES: (i) Seed germination and early seedling growth are often more salt sensitive than later stages. (ii) Tolerance is a relative term, so that a turf species defined above as "tolerant" may still be relatively sensitive in comparison to plants that live in seawater with EC ~ 54 dS m-1. (iii) In addition to the differences among species shown in the table, considerable differences in salt tolerance exist among genotypes within a species; therefore selection of species and cultivar are important for successful turf culture in salt affected areas.

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[ ] WHERE THE DAMAGE WILL MOST LIKELY OCCUR

Activity of the Argentine stem-grass weevil is primarily confined to the drier regions of turfgrass swards. On golf greens, the perimeter of the mown surface and any apron regions adjacent to bunkers are typically the most susceptible regions, as they dry out earlier than the centre portions.

[ ] MONITORING AND TIMING OF APPLICATION

Theses are the best areas to monitor for activity. Stem Weevil will be present from September to March. If you see Adults look for early symptoms (ie wilting/ dry patch) then apply ENs immediately. **As a rule, treatment with ENs should be done at the time you would normally get best results with traditional chemical treatment.**

[ ] HOW TO IDENTIFY ACTIVITY

- Leaf clippings placed in full sun will reveal the presence of adult weevils
- Flushing of adults using a weak Pyrethrum solution
- Larvae are difficult to spot without extraction and soil sieving

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"McMaugh he's a real pro"

At the recent Millennium Turfgrass Conference and Trade Show, Peter McMaugh was bestowed as the recipient of the 2000 AGCSA Distinguished Service Award.

Proudly supported by and presented in partnership with Scotts Australia, the award recognises an individual who has made such contribution to the Australian Golf Turf Industry that they have left an indelible mark.

Peter has certainly done just that and what follows is a transcript of the speech that Peter made in acceptance of the award. In the style of McMaugh, unique for its 'frankness' and honesty, it provides an interesting and entertaining commentary on the industry.

I would like to say that in one way I am surprised because while I have indeed had a long association with golf it is only one section of the broad turf industry in which I work and will always continue to do so. While golf is important it is not the whole world of turf.

I would also like to express my thanks and in a special way my satisfaction that this award is associated with Scotts. I have had a very long friendship with Scotts and did the first serious trial work on their products in Australia about twenty years ago and formed a great friendship with Ray Huey who sadly died about three months ago.

I don't know how many of you realise the huge research effort of many Millions of dollars over more than 40 years that Scotts has poured into this industry. We should be very grateful to them for this and their continued support.

I think it is well recorded that from 1964-1978 I spent almost 40% of my working life shaping the now defunct ATRI. The name ATRI was devised in 1970 when there seemed to be a chance of a single Australian research entity being developed. However, this did not come to fruit and the Victorian T.R.I. was developed. Sadly both are now defunct. With the rise of the D.P.I. turf venture in Queensland, there seems to be another chance – I hope and trust that the AGCSA will see this not as a rival but as a co-operator in the big world.

The demise of both ATRI & VTRI illustrates the poverty of vision, which has done so little in this country to produce both funding for turf research and an actual permanent research performance.

It is the sad historical fact that no administration of sports using turf has had the will to raise a substantial trust fund for turf research. This is nothing new. When the International Turfgrass Society held its first meeting in 1969 I was not in a financial position to attend. However I did attend the second conference in the USA but had to take holidays to go and did not receive one cent of support from my employers. Yet, when I returned they demanded a report of my trip – needless to say they are still waiting.

By the time of that conference in 1973 I was no longer the sole scientist working full time in Australia in turf. I had been joined by Dr. Brian Stynes who did wonderful work on nematode problems in Newcastle. Brian is now a senior administrative scientist in AQIS.

That trip was a tonic for a very lonely researcher and it clearly illustrated to me that the work we were doing was at least as good as, if not better than most other work I saw at that time.

The strong friendships forged then enabled me to bring to Australia people such as Dr. Jim Beard. I organised his first visit, raised the finance and got 'rapped over the knuckles' by my Board for having the audacity to do such a thing without their permission. Needless to say I didn't exactly regret any actions.

These same friendships ultimately saw me as President and host of the 1997 ITS conference in Sydney. The memory of the spontaneous standing applause I received at the conclusion, for a conference well done, will live with me forever. It was as unexpected as this award.

I take this opportunity to thank those who gave generously to help me then. Unfortunately there were others who let the side down badly. This was partly due to petty jealousy and partly to a long running campaign to bring down the tall poppy – more of that later.

Knowledge is the key to power and performance. When I first started in turf I hired a graduate of Hawkesbury Ag College as an advisory assistant. From this I learned a salutory lesson. He saw the problems of greenkeepers as a set of fixed problems for which there had to be a fixed answer. He wanted a little black book of answers from me – like a cookbook. Needless to say he didn't last, but before he left he complained to the board that all I did all day was read. This amazed me as my main task (being completely ignorant of turf), was to try to absorb 50 years of the work of others. However it did eventually bring forth from Jim Beard the remark that I was one of the few people he had ever met in turf who really knew the literature.

I have always been keenly aware of my duty to share my opportunities my knowledge and gifts with others. This is a set of values which I inherited from my truly gifted parents who were privileged to be educated and who passed this privilege to me. There are very few people who have had the opportunity to have studied classics, science and education at tertiary level. It is a truly humbling experience to read Aristotle and see a gigantic mind at work. When you realise the brilliance of his observations of nature and know how little general science other than mathematics permeated the culture of his day you realise that like Darwin he was the outstanding mind, which influenced centuries of European cultural development.

Because of the culture of sharing knowledge I

received from my parents I have worked tirelessly for both TAFE and Universities to assist in the improvement of their student programmes.

It makes my heart bleed to see a range of impostors with no professional experience in turf and I believe very little in education trying at the behest of mean minded men of government, to turn our TAFE courses into garbage. As a result I meet lots of practisioners who know all the words but know nothing of the 'real guts' that integrates theory and practice.

While I applaud the development of University level courses in turf, I am concerned that what I consider a major goal is missing. I do not see evidence of increased hunger for learning after graduation. Rather I see a disturbing attitude of 'pseudo einsteinism' emerging. No matter what you think you know there will always be more to know than you ever will.

One of the great lessons that has to be learned in life is to 'know when you don't know'. Without it you go nowhere.

Because of the vacuum in research here in Australia, there has emerged a rush by 'interested' parties to try to set de facto industry standards for their products, under the guise of 'researched' performance on a single product without reference studies. I consider this a very dangerous situation because it leads to second-rate performance, not the pursuit of excellence.

While I can't call it cheating it does draw attention to the lack of objective comparative data available to the industry when such practices are followed.

It also points out the serious deficiencies that occur in specifications written for turf by so called experts – mostly engineers – who have no knowledge of turf but who accept these psuedo guidelines because they have no others.

If the tomes they produce as specifications were judged by weight they would be world-beaters. Don't be surprised if in the next few years you see a huge increase in litigation because of this serious defect in our industry.

This need for objective standards I highlighted in a recent talk where I emphasised the need for objective data as the criterion for making judgements. So many projects are 'stuffed' by people who have opinions about opinions instead of opinions about facts.

It is a devotion to producing objective data, which has been the backbone of my scientific career and will always continue to be in whatever work I do.

During the 14 years that I guided ATRI we produced more than one major technical break through per year some of which were outstanding firsts of international importance. Some of this work, which I began with Professor Martin is still not published but hopefully one day it will be. It is a record of which I am very proud and a line of attack, which disappeared from ATRI after I left and which I firmly believe led to its demise.

During life at ATRI I met many great characters; C.J.P. Smith, the inventor of the level lawn and many other implements used in turf, Dennis Pederson, the inventor or the Quadri-tyne mini tyne concept are two who come readily to mind.

Life after ATRI was to be farming at my Qualturf property at Richmond NSW. I very quickly learned two lessons.

I thought that after my 14 years of giving advice I knew something about turf. Life at the coal-face taught me that I really didn't know as much as I thought I did. I had to learn the lesson that production turf and sports turf are 'chalk and cheese'. But I learned. Getting your hands dirty is very useful for any aspiring scientist. It is also a lesson, which should not be missed by aspiring Golf Course Architects.

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My personal farming career was very short lived and I had to learn my second lesson, the importance of listening. I had ignored the medical advice that sent me to the University many years before and I once again had to listen to being told to use my brains and not my body.

The major disadvantage of this was that having seen and worked in every state in Australia, I have had to keep living in aeroplanes and seeing the world.

I have worked in all but three continents and returned only last night from working in China and the U.K. The reward has been a fine cultural feast.

Some of the more interesting projects on which I have worked have been; the first pure sand root zone perched water table in Australia at North Sydney Oval, the original Parramatta Stadium, the WACA reconstruction, the MCG wicket reconstructions which led to the project which developed the couch grasses C1 and C3. The reconstruction of Rosehill and Canterbury Race Tracks, Kerry Packers Polo fields, the two warm-up stadiums at the Olympics and more recently, Randwick Race Course. These plus so many golf courses I can't count them. Establishing commercial turf farming in China has also been a real challenge. The reward of my latest trip was to see the project I started six years ago not only reaching maturity and sponsoring six new J.V.'s but also vindicating the judgements I made there many years ago in an unfamiliar and hostile environment.

A major lesson that I have learned from my consultancy time has been the importance of idiot proofing everything you do. The failure to do so can cause well planned and constructed projects to be destroyed by practitioners whose monumental ignorance is matched only by the importance of their opinions to themselves.

My experiences brought home to me on more than one occasion the incompetence of many so called consultants. It is a sad reflection on the quality of our industry that I make more money out of repairing damage done by others, than I have out of doing it right the first time. Indeed a combination of incompetent management and incompetent consultancy combined to produce a bitter court case over the original Parramatta Stadium. I am happy to say that this yielded me a major practical moral victory but at a major cost to me personally. It isn't nice to be sued for $1.25M and have to withstand the onslaughts of 'experts' who have no experience in your field and yet are prepared to give opinions based on ignorance.

This period of my life has also seen me able to indulge in an area of work, which started at ATRI, golf course architecture, with my partner, Geoff Hatton. We have produced some notable work in the heritage reserve of Lord Howe Island and lately at Brisbane Golf Club. The ecological sensitivity of both of the sites has offered great technical challenge.

I have also had the privilege of working with many internationally notable golf course architects. This has been an enjoyable and profitable exercise. Their ignorance of the expertise in turf in Australia is well illustrated by the occasion when Robert Trent Jones Junior commented to an architect for whom I was overseeing Joondalup said, "Where did you get that guy McMaugh? He is a real pro!"

During this time, I have also released the high quality couch grass, Windsor Green which I bred out of WinterGreen. Winter Green which had been my previous release has become an industry standard. I prefer to let the quality of my grasses speak for themselves or in objective data reports such as the National Trials. However, it says a great deal for the quality of our Couch Grasses when they have been used as the parents in breeding programmes to produce the Princess and Sydney lines which are the best quality seeded couches yet to see the light of day.

Through the MCG and John Mitchell, I initiated the program, which has produced C1 and C3 Couch grasses at the V.T.R.I.

Once again this is an area where self-promotion often gets in the way of objective data and highlights the desperate need for this data collection. I'm not talking about 'Micky Mouse' plots, I mean real trial work under wear.

This lack of comparative objective data has presented the industry with many problems not the least in the area of additives for greens construction.

The promotion of a host of 'biological' or 'organic' stimulants for healthy greens is a source of irritation. When I am asked to consider these I always ask for the data and what gets trotted out is a host of testimonials or other meaningless messages. These are from the people I call 'softly people', - short on fact talking loudly.

I also believe that it is very important to be able to see brilliance and recognise it in others. Over my years in turf I have seen many developments where the technical benefits have been few but about which there has been much whoha and drum beating. I have always been very sceptical about the real benefits of reinforcing in turf – with the exception of racing - even to the point of expressing this to Jim Beard in Texas who while looking at his plots said to me, "Peter, you are awefully quiet – what are you thinking?" and I said with my usual diplomacy "I am wondering whether I am looking at the ultimate in useless experiments!"

But I had to lift my jaw from the ground when I saw what I describe as the 'Ashley Martin's for

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turf', the Desso fibre Impregnation System. The work of Frankland Versteeg at Papendal in Holland has been amazing. It is almost inconceivable that 3% of Plastic can give a 300% increase in wear on playing fields and stabilize surfaces on sand when 100% denuded.

Another is the Verti-drain. I first tried to get it for Australia 20 years ago but I only succeeded in getting into the act 4 years ago. It is truly the prince of renovators. I am also proud to have a great friend and sales manager in Wayne Pounsberry who has given me a new zest for life in this industry.

Over the years you have christened me the 'chicken shit king'. Indeed I was responsible for turning Dynamic Lifter from a play-thing to an economic reality. Many years ago at a conference in New Zealand, I expressed an opinion about the use of chicken manure pellets in a greens mix. Dr. Vic Stewart who was professor of soils at Aberystwth and another invited speaker got up and added to the remarks by saying he was amazed to hear an Australian talking sense. He thought Australians were just other Americans who talked nonsense in these matters. And he went on to talk about his research, which had showed the importance of lumps of organic matter to produce an interaction with plant roots causing the multiple branching of feeder roots and healthy grass. How many of you have seen long unbranched and largely disfunctional roots in sand profiles. I am pleased to tell you that I'm not only still working with chicken shit but that I am in it deeper than ever.

The development of Nutri-Gro with its inventor Neil Tumbers has been the most interesting scientific work in which I have ever been involved. This is, in my opinion, one of the great developments in alternative solutions to the perennial problems of insect and disease control in turf – safe effective and hopefully idiot proof. The amazing results we have achieved in nematode protection have turned around Newcastle Golf Club and results in Japan with Snow Mould control are very exciting.

Japan is also an object lesson to us in the development of biological and non-chemical controls in turf management.

I have been told on many occasions by many people that my human relations could be improved. My propensity for 'bluntness' was well illustrated when Jim Beard took me to dinner to a gold plate restaurant in Michigan. This restaurant was famous for its roast beef loin. When asked by Jim how I enjoyed the beef I replied, 'it is fabulous you can cut it with a fork, its just a pity it doesn't have any taste'.

It was also illustrated by a conversation in Singapore with Michael Wolveridge.

Michael - "Peter I hear you have not been well?"

Peter - "That is true Michael"

Michael - "Well, Peter you should look on this as a second chance at life and perhaps this time you could be a little more mellow?"

During my early years at ATRI, I was seen as a 'hatchet man' by a lot of green keepers who did not appreciate the fact that the people who paid their wages also paid mine, to be there to help them. I remember a very stocky man with a huge abdomen protruding above a rather low-slung pair of khaki shorts, no shirt and no shoes, arms akimbo, saying to me – "I'm not spilling my guts to you", I replied, "it is just as well because it would have been a hell of a mess".

When I began at ATRI the term of a Bowling Green Keeper was often a maximum of 18 months. When I left, careers of 10 years plus at one

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club were not uncommon. This is a message which is still not well understood. Using a consultant is not a sign of failure it is a sign of intelligence in the use of resources. I have often told the story of the superintendent who was trying to imitate my work and lost a whole fairway prior to a tournament. When I asked him why, he said he preferred to do his own research!

I have over the whole of my professional career been as generous with my help to anyone who asks, as I could be. It is sometimes easy to mistake a degree of intellectual aloofness with arrogance. I hope I have never been placed in the situation where any of you have found me arrogant. If so I take this opportunity to apologise for it.

No man is an island and this honour today could not have happened without the help of many others. I would like to take this opportunity to say thank you to those who have been my colleagues and co-workers and co-operators over many years. They are too many to name individually and sadly some are no longer with us.

I have always been a person who finds the limelight difficult to deal with. My family considered brilliance not something to show off about but something to be humble about and a gift to be shared. This natural propensity for keeping in the background rather than the centre stage has made me an easy target for people who have tried to climb over the top of me. Every time I developed a major breakthrough, stories emerged that someone else had invented it. I know that to many of you especially the babies among you who were not born when I began my turf career and who don't know me well, may consider me as a yesterday man. I can only assure you that as one would be hero once said about me, I wish I knew as much about turf as that old bastard has forgotten. I am not going away in the foreseeable future.

I am only human and have human failings but one aspect of this industry with which I have found it difficult to come to terms is the bitchiness and meanness of spirit, which pervades much of it.

I know no industry with so many well-balanced members – people with chips on both shoulders. I know I have been subjected to some vile campaigns to denigrate me personally and professionally. Indeed my long time secretary when told of this award and that I would be receiving a blazer said to me, "I hope they told the tailor to make room for all the knives in your back".

One thing I know is that I have succeeded in changing the face of the industry in many ways. How do I know it? I never ceased to be amazed at the speed with which good advice, given somewhere during consulting, races like a forest fire through the industry. Many of you have benefited in major or minor career ways in your professionalism from your associations with me.

Just as often I have been asked what have all these people you have helped, done for you in return. My answer has always been – does it matter? I suppose it does but you are the only ones who can answer that.

And today you have. The reward I have been given is very much an answer and this I receive with gratitude and humility.

There is one person who does believe I have good personal relation and to whom I owe very great debts of gratitude for seeing me through a period where my future life was very uncertain. To her, my wife Rae, thank you. I know you share this occasion with me with pride.

I would like to wind up this talk with this piece of wisdom.

A turkey was chatting with a bull.

I would love to be able to get to the top of that tree, sighed the turkey, but I haven't got the energy.

Well, why don't you nibble on some of my droppings? replied the bull. They're packed with nutrients.

The turkey picked at a lump of dung and found that it actually gave him enough strength to reach the first branch of the tree.

The next day, after eating some more dung, he reached the second branch. Finally after a fortnight, there he was proudly perched at the top of the tree – he was promptly spotted by a farmer, who shot him out of the tree.

Moral of the story:

Bullshit might get you to the top, but it won't keep you there.

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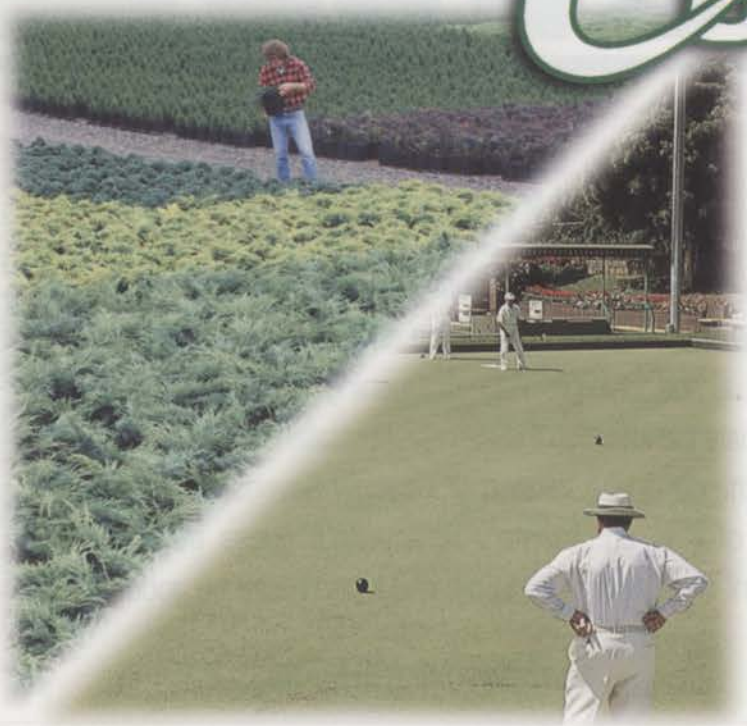

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By Phil George

SYDNEY

Ray Young & Bill Wilson (Orara Turf) review progress of the Sydney Football Stadium.

a time to shine

Seeing 40 men and women pushing pretend lawn mowers around the stadium in front of a television audience approaching 4 billion people at the Olympic Games Opening Ceremony makes you appreciate the affection the average Australian has for green grass. What the Japanese version of Channel Sevens Gary Wilkinson made of it in commentary is anyone's guess but from that moment our turf was on show and it had better be good!

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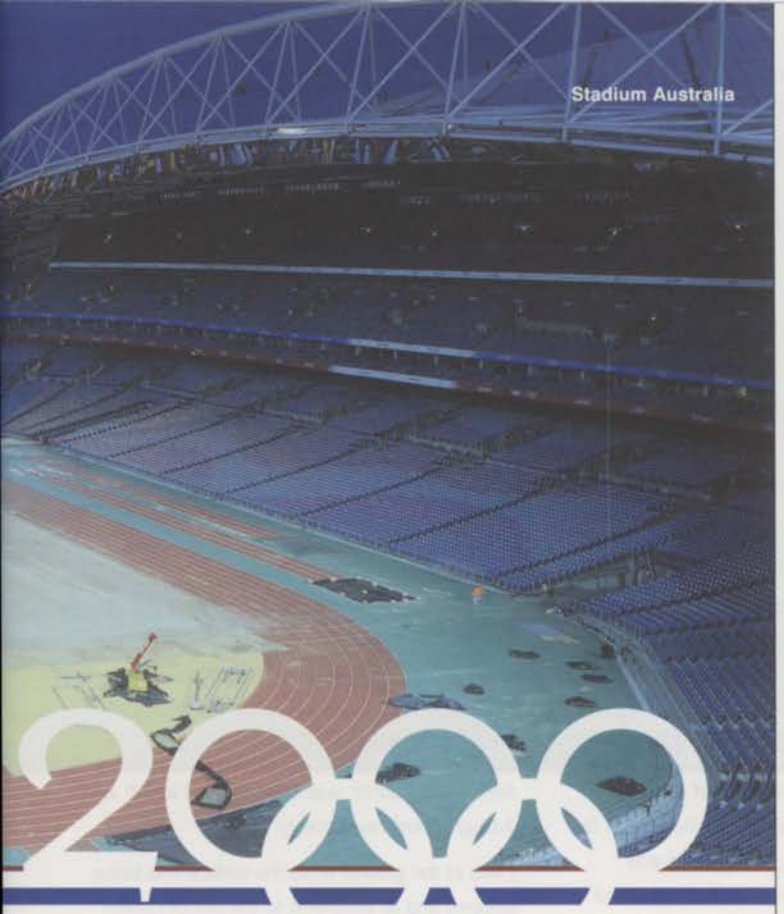

We run on it, sit on it, hit balls off it and if its any good we brag about it. Hence, the Sydney Olympic Games offered the turf industry an opportunity to shine like never before. Although it seemed that turf was as rare as hens' teeth and contractors often had to be booked months in advance, the venues prepared for the games were in pristine condition and those involved should be commended on their efforts.

As with many sporting complexes, the Olympic Games presented an opportunity for the Sydney Football Stadium to undergo its first major facelift in its short 12-year history.

This transformation was in preparation to host 10 Olympic soccer matches over a seven day period and included the installation of an additional 108 high wattage lights, removal of all existing advertising, construction of a new media enclosure and the replacement of the turf playing surface.

The Sydney Organising Committee for the Olympic Games (SOCOG), were of the opinion that after a full season of Ruby League (86 matches, 27 training sessions), 35 event days, various film shoots and two weeks of Barbara Streisand, the ground would not have sufficient time to meet the exacting FIFA requirements for international soccer.

Thus, in October 1999, SOCOG along with the Olympic Coordination Authority (OCA) invited companies to tender for the complete resurfacing of the Sydney Football Stadium.

The job involved removal of the top 50mm of the ground, laser leveling to achieve a fall of 1% then resurfacing of the ground with 8,000m² of 'Legend' Couchgrass oversown with 'Penguin' Ryegrass.

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Melbourne Cricket Ground

Stadium Australia: before and after

In December 1999, Bill Wilson from Orara Turf and Bob Paddison of Turf Drain Australia were announced as the successful tenderers.

To guard against the possibility of delays due to torrential rain either at the stadium or at the Coffs Harbour turf farm, the ground was resurfaced in three sections and commenced on Monday 21st of August following the conclusion of the Winfield Cup.

Once the surface was removed, Dynamic Lifter was applied at the rate of 50kg/100m² and then rotary hoed to a depth of 125mm. The surface was laser leveled, 'Trichopel' and Best 'Even Starter' was then applied at 2.5 and 3.0kg/100m² respectively.

I was at the ground while the surface was being stripped and as testament to the skill of curator Michael Finch, the amount of couch in the ground just below the surface, given the intensive winter schedule was quite staggering.

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Orara Turf began laying the 50mm thick non-reinforced turf blocks on Wednesday 23rd of August and the job was completed 'spot on' schedule on Friday 1st September giving Michael Finch and his team just under two weeks for some routine maintenance in preparation for the first match.

Following the Olympics, the next scheduled event is not until February next year so Michael intends to spray the ground with illoxan to remove the rye, then carry out an intensive renovation that will involve, scarification, verti-draining, topdressing and fertilising.

Shortly after IOC President Juan Antonio Samaranche etched the phrase "the winner is ... Sydney!" into Australian folk law, Dr. John Lil and Tony Ware from the Melbourne Cricket Ground hatched a plan to give sports mad Victorians some 'September Action' of a different kind – Olympic Soccer.

Step one of making this dream a reality was to find a turf system that would allow them to provide a surface suitable for international soccer within a time frame likely to be a couple of days at best. Their search led them to Pro Player Stadium, Miami, Florida where the Motz group installed 10,000m² of their stabilized turf system in just under 20 hours in preparation for the NFL Super Bowl.

Before long, Victorian turf producer, HG Turf had been contracted by the MCG to provide the club with 8,400m² of the Motz reinforced turf system for 11 Olympic Soccer matches.

2nd September 2000 and the turf, still warm with red and blue blood from the crushed Melbourne Football Club was being stripped to make way for the new turf from HG Turf's turf farm in Alexandra, north east of

Melbourne Cricket Ground

272 CARRYALL

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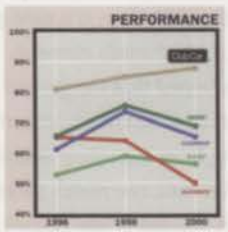

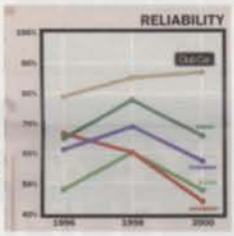

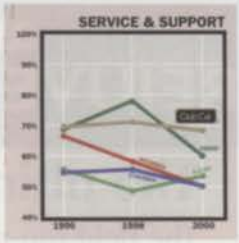

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Bruce Stadium

Turf was grown in a secret location 2km from Stadium Australia.

Melbourne. Once the surface was stripped using a Manoeuvre Mow Koro Field Top-maker, specialised equipment was used to install the (1m x 10m x 50mm) rolls of GN1 couchgrass oversown with Pennant ryegrass.

Working around the clock in 12 hour shifts, by late on Tuesday 5th September, the turf team was on the Hume Highway heading North to the embattled Bruce Stadium in Canberra.

Just west of Canberra in Belconnen, Bruce Stadium is another high use facility that has been in a race against time to bring Olympic Soccer to Australia's Capital Territory.

The surface at Bruce Stadium is a sand profile reinforced with Reflex® mesh elements. Although it was hoped that the ground would have sufficient time to recover from turf damage resulting from a grueling season of Rugby League (at least one match played in snow), the OCA decided in late August that the surface would need replacing with StrathAyr MegAyr® turf.

StrathAyr licensees in Cairns and Camden NSW were used to supply the 'Legend' couchgrass oversown with turf type Ryegrass. The turf from Cairns was established as washed sod at the end of June and overseeded some weeks later with a turf type ryegrass. Although conditions are perfect for growing couch and ryegrass at that time of year, it could only be described as immature when it was cut, rolled and trucked all the way down to Canberra.

What greeted the turf upon arrival in Canberra were temperatures cold enough to freeze puddles on the ground and after a succession of severe frosts (see table below) the turf was pronounced dead and on Thursday 31st August the OCA commissioned HG Turf to replace the surface.

As fortune would have it, HG Turf had established a 'back-up' field in the event that there were problems with the MCG surface so turf supply was not a problem and once finished at the MCG they went straight to Canberra and had it completed by the end of that same week. Mark McGarry of Stadium Turf Management and Mick O'Shannessy from HG Turf (formerly of AFL Park), were responsible for the maintenance of the new Motz surface throughout the Olympic tournament and did a marvelous job.

The toughest test was still to come. Although the actual process was reasonably straight forward, the logistics involved were a nightmare, but replacing the surface at the Olympic Stadium (8,000m²) just hours after the completion of the Opening Ceremony in

Daily Temperatures throughout August 2000

Date	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd
Min Temp	6	1	-4	1	5	5	2	-4	-4	1	5	-2	-1

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HG TURF
STADIUM TURF

preparation for the biggest sporting event ever in Australia, was something pretty special for HG Turf.

Partners in the project, The Green Horticultural Group worked tirelessly in the preparation of the replacement surface that was grown at a 'secret location' just 2 km from the main Stadium. With accommodation prices through the roof, HG Turf set up a makeshift campsite for 50 people alongside the new turf and brought in mothers, wives and girl friends to take care of catering.

Security was unbelievably tight; vehicles required bomb checks each time they entered the Stadium with the new turf, equipment or crew who were each required to have photo ID and accreditation. Even with these constraints and obvious delays, the existing surface had been stripped and the new one laid and ready for play in 72 hours. As you may have guessed, the Hammer Throw and Shot Put events can do some pretty serious damage to the surface. Extra turf was kept on hand to repair these areas prior to the men's soccer final between Spain and Cameroon on Saturday 30th September.

Upon completion of the job, Hamish Sutherland (HG Turf) commented that "never before had so much planning gone into the logistics of a job, it was a huge relief for us just to get it done"

Just meters away from Stadium Australia at Homebush Bay is the Sydney Show Grounds Stadium that was one of the venues selected to hold Olympic Baseball.

The surface was so badly damaged during the Easter Royal Show in April this year that the Olympic Coordination Authority decided that a total resurfacing of the ground was required to achieve the result required for the Olympic Games.

Contractors and suppliers of sports turf products, Matt Collins & Sons were contracted to do the work which involved taking the top off the existing surface, laser grading the existing sand base and re-turfing with washed 'Legend' couchgrass oversown with a turf type ryegrass at the rate of 250kg/ha.

At the same time, significant 'conversion works' were required to have the ground conforming to U.S. Baseball specifications. Specifications were provided by principal consultants for all the Olympic soccer and baseball venues, Young Consulting Engineers.

The dirt infield and the 6m wide 'warning track' that runs around the perimeter of the field just inside the fence has an overall depth of 250mm and are constructed in two layers; a mica base-layer toped with red brick sand.

Fine dry weather in Sydney allowed the work to be completed by the end of May (four weeks), the 'Legend' couch demonstrating an ability to develop a significant root system despite the fact that it was winter.

A delegation from the International Baseball League visited the venue at the end of August and although some minor modifications were required they were satisfied with the maturity of the surface given the tight time frames involved. Matt Collins & Sons were responsible for maintenance of the surface up until the 13th of September and the first of 18 matches commenced three days later.

The other Olympic Baseball venue is Aquilina Reserve located in Blacktown and is a truly world class baseball and softball arena consisting of three baseball and three softball grounds. The number one baseball field is a sand based ground turfed with 'Legend' and the two practice baseball grounds are constructed from a loamy soil and are turfed with Greenlees Park couch. All three softball grounds are sand based and are turfed with Santa ana.

The fields at Aquilina Reserve were built by Geoff Hatton from Manoeuvre Mow and a tremendous amount of work has also been done by the Blacktown Council. Moanoeuvre Mow have been doing all of the maintenance work on the fields since November 1999 and have been responsible for their maintenance right through until the end of September this year. Numerous Olympic Athletes have been full of praise for the venue, some have gone as far as saying that they are the best baseball fields they have ever played on. Post Olympics, the venue will become a tremendous asset to the local community and to Australian baseball and softball.

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The involvement of Collins & Sons and Young Consulting Engineers extended to the Cross Country Event Course at the Sydney International Equestrian Center at Horsley Park.

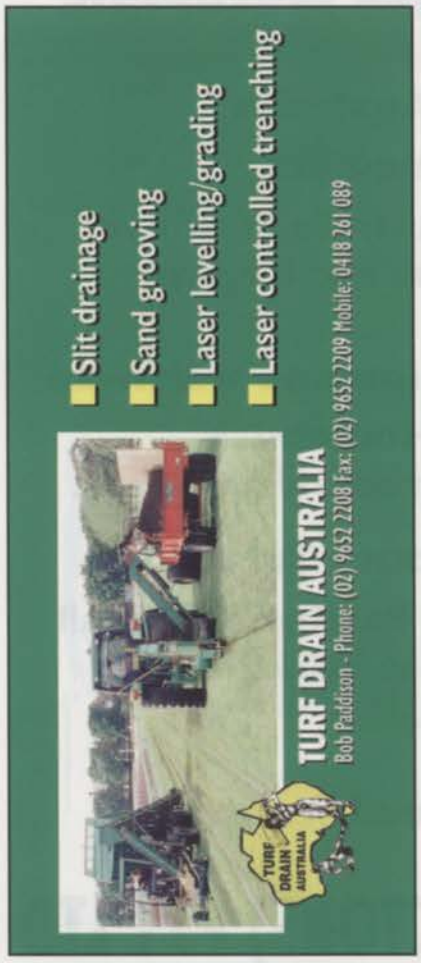
To the uninitiated this is a very interesting complex. The course consists of four phases; phase A is 2.5 kms of roads and tracks that horses use as a warm-up, they are then required to move on to phase B, a 1100m steeple chase track that the horses take at full pace before warming down on another 2km track. The horses are then 'vetted' before being allowed onto the 7.5 km cross county course.

In total, 20 hectares was planted out to a male sterile type kikuyu over a period of six months. As far as turf culture goes, the course is unique in the fact that the course is by no means flat and the quality of the soil and water was marginal. Complete turf establishment took two years and was heavily reliant on regular aeration and the use of organic fertilisers.

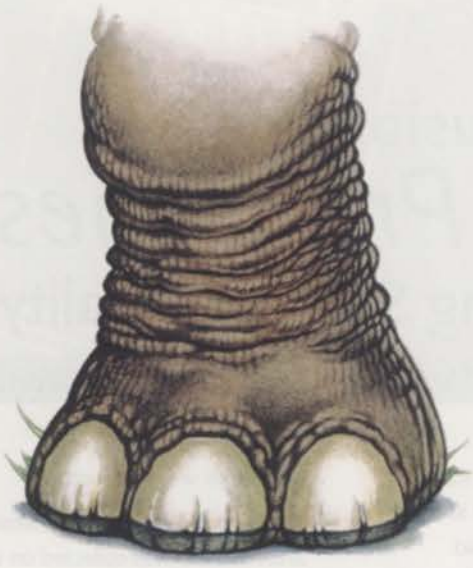
Although many will consider the excesses of the Olympic Games an unnecessary waste of resources, the turf industry will benefit from the opportunity to 'push the boundaries' in terms of what can and can't be achieved under certain conditions and time constraints and the sports community have been blessed with a number of world class facilities.

Horsley Park

Excellent root growth achieved in preperation for work at Stadium Australia



Guess Which Animal Won't Track On Your Turf



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research

The Effects of Soil Inclusions on *Soil Physical Properties* and Athletic Field Playing Surface Quality

Andrew S. McNitt and Peter J. Landschoot

In this study we wanted to determine if the addition of various soil inclusions alters turfgrass wear resistance, soil physical properties, and/or playing surface quality (hardness and traction).

PROCEDURES

Field plots were established at the Joseph Valentine Turfgrass Research Center in September of 1995. The plot area consisted of a gravel drainage layer overlaid by a 62.5mm intermediate layer of fine gravel and course sand. Over this was a 100mm layer of a 90% sand, 10% sphagnum peat (v/v) rootzone mix.

The experimental design was a split plot (plots split by wear) with three replications. A grid of 4m x 4m treatment plots was laid out over the 100mm of rootzone mix and frames 150mm high were installed. The frames were filled with the mixed soil inclusion/root-zone treatments and the surface was levelled by raking and hand tamping.

The Netlon treatments were filled to within 15mm of the surface and then top dressed with unamended rootzone mix. With the Sportsgrass treatment, rootzone mix was filled to within 25mm of the top and the Sportgrass was cut to size and laid. Rootzone mix was then broomed into the surface so only 3.5mm of fibre was protruding from the surface.

The frames were then removed and the plots were seeded with SR 4200 perennial ryegrass. Nutrients and water were applied as needed and the turf was mown twice per week with a reel mower at a height of 35mm.

Treatment plots were split with three levels of wear. These were; no wear, medium wear (approximating 3 NFL games/week), and high wear (approximating 7 NFL games/week). Wear was applied with a Brinkman Wear Machine.

Soil physical properties included soil bulk density, soil water content and water infiltration rate. Surface hardness was measured using a Clegg impact soil tester (2.25kg), linear traction measurements were taken using PENNFOOT, configured with a weight of 120kg and a studded NFL boot. Turfgrass density was rated visually and recorded on a scale of 0 to 5. At the end of the study divots were created using a pitching wedge head attached to a weighted pendulum mounted on a three-point hitch. The maximum width, length and depth was measured.

Turfgrass density, soil bulk density, soil water and hardness was collected on six occasions. Water infiltration rate was measured twice and divot measurements were made at the conclusion of the experiment.

Treatment	Rate of Soil Inclusion (%dry wt)
Control	0.0%
DuPont Shredded Carpet	0.5, 1.0, 2.0, 3.0%
Netlon	0.3%, 0.5%
Nike Light	3.0%
Nike Heavies	3.0%
Sportgrass	NA
Turfgrids	0.3%, 0.5%

This table lists the individual treatments and the rate of soil inclusions on a percent by oven dry weight of the sand root-zone.

RESULTS

See summary table on page 32.

Soil Physical Properties and Playing Surface Quality

In the summary table we attempted to summarise how the treatment main effects differed from the control on the six rating dates of this study. This summary table may give an incomplete picture of the dynamic nature of the property being measured as different levels of wear are imposed over time.

Soil Bulk Density

In this experiment the recycled products (Nike and DuPont),tended to reduce soil bulk density. A lower soil bulk density means lower soil compaction. Soils lower in bulk density typically exhibit lower resistance to root penetration.

The lower soil bulk densities are most evident for the recycled products that are added to the sand at the rate of 3% by weight. We could expect that adding 3% of a soil inclusion, lighter than soil, to a sand root-zone would decrease bulk density. While the high rates of the recycled products show the most dramatic differences, these results are not simply rate dependent.

The Netlon 0.5% treatment was the only inclusion to consistently produce a bulk

Frames were filled with the root-zone treatment and the surface was levelled by raking and hand tamping

Wear was applied with a Brinkman Wear Machine

density higher than the control; however, Turfgrids and Netlon typically had bulk densities higher than the recycled products with the exception of the DuPont Shredded Carpet 0.5% treatment. Obviously, the rate of DuPont Shredded Carpet affects bulk density. It should be noted, that it would be impractical to add 3% by weight of Netlon or Turfgrids to a root-zone.

Surface Hardness

Surface hardness has been defined as the ability of a surface to absorb impact energy. High surface hardness could result in greater injury to players during impact situations, whereas lower surface hardness values may create early fatigue in players leg muscles.

The manufactured products (Netlon, Sportgrass, and Turfgrids) produced higher Gmax (surface hardness) values than either the control or the recycled product treatments on each rating date over both years of the test. The DuPont Shredded Carpet 3% and Nike Light 3% had lower Gmax values than the control on every rating date over both years of the test, with differences becoming more pronounced after wear was applied.

Soil Water Contents

Soil water content is a measure of the total amount of water held in a soil and does not indicate the amount of plant-available water. Soil water contents varied with the Turfgrids 0.5% treatment having higher soil water content than the control on four out of the six rating dates and Turfgrids 0.3% having higher soil water content on three dates. Both Sportgrass and Nike Light were lower in soil water content than the control on five of the six rating dates.

Turfgrass Density

Both Nike products provided greater turfgrass wear resistance, as reflected in turf density ratings, than the control on over half of the rating dates. Sportgrass exhibited lower density than the control on three of the six ratings dates and only after wear was applied.

Water Infiltration

Water infiltration is a measure of the rate at which water moves into a soil. Low infiltration rates and poor surface drainage can result in puddling and wet playing conditions. Sportgrass had a higher water infiltration rate than all other treatments in 1996. DuPont Shredded Carpet 2% and Turfgrids 0.5% had infiltration rates higher than the control in 1996. At the end of this study all treatments had infiltration rates greater than 500mm per hour. This is considered adequate or high for most athletic field root-zones.

Traction

Traction of a playing surface can be defined as the horizontal resistance a surface provides to an athlete while wearing cleated or studded footwear.

Few traction differences were found in either 1996 or 1997. At various times throughout the study a treatment may have exhibited traction values lower than the control, but no trend is evident.

Divoting

Divoting is the complete shearing and removal of portions of the turfgrass. In American football this type of wear can account for significant turf loss.

All of the treatments in this study produced shorter divots than the control, with Sportgrass producing shorter divots than all other treatments when averaged over the three wear levels. The presence of the inclusions added some shear strength to the turf surface thus reducing divot length. This was most evident after wear was applied and thus turf divoting decreased. When there was no wear and 100% turf cover only Turfgrids 0.5% provided significantly shorter divots.

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PRODUCTS

This section examines each of the inclusions individually.

DuPont Shredded Carpet

The addition of DuPont Shredded Carpet to the sand root-zone in this study significantly reduced soil bulk density. Although this trend was evident when no wear was applied it became greater as the wear level increased. This indicates that the material lowers bulk density as well as resists compaction as wear increases. The greater the rate of DuPont Shredded Carpet added, the lower the bulk density.

Along with the lower bulk density we also noted a decrease in surface hardness. The more DuPont Shredded Carpet at the 3% rate always provided lower surface hardness values than the control over both years.

In addition to lower bulk density and surface hardness, DuPont Shredded Carpet reduced the length of divots. All rates of DuPont Shredded Carpet reduced the length of divots when compared to the control.

DuPont Shredded Carpet produced no consistent decrease or increase in traction or soil water content over the control. There was a slight increase in turfgrass density when compared to the control, especially in the high wear plots.

Netlon

The addition of Netlon to the sand root-zone significantly reduced divot length

Summary Table. Number of rating dates (max 6) that a treatment main effect mean is significantly different (higher or lower) than the control. Divot length was measured only once. The mean divot length is listed in the table. [# = number rating dates]

Turfgrass Density (wear resistance)		Soil Bulk Density (compaction resistance)		Soil Water Content		Surface Hardness		Traction		Divoting (length)	
Treatment	#	*Treatment*	#	*Treatment*	#	*Treatment*	#	*Treatment*	#	*Treatment*	*cm*
Nike Lights	5	DuPont S.C. 3%	6	Turfgrids 0.5%	4	DuPont S.C. 3%	6	Sportgrass	1	Sportgrass	15.2
Nike Heavies	4	DuPont S.C. 1%	5	Turfgrids 0.3%	3	Nike Lights	6	Higher		Turfgrids 0.5%	16.6
								CONTROL			
								Lower			
DuPont S.C. 2%	2	DuPont S.C. 2%	5	DuPont S.C. 1%	2	DuPont S.C. 2%	4	DuPont S.C. 2%	1	DuPont S.C. 3%	18.2
DuPont S.C. 3%	1	Nike Heavies	5	DuPont S.C. 0.5%	1	DuPont S.C. 1%	1	Nike Heavies	1	Turfgrids 0.3%	18.6
Turfgrids 0.3%	1	Nike Lights	5	DuPont S.C. 2%	1	Nike Heavies	1	Nike Lights	1	DuPont S.C. 2%	20.0
Higher		DuPont S.C. 0.5%	3	Higher		Softer		Turfgrids 0.5%	1	Netlon 0.5%	20.8
CONTROL				**CONTROL**		**CONTROL**					
Lower				Lower		Harder					
Sportgrass	3	Turfgrids 0.3%	1	DuPont S.C. 0.5%	1	DuPont S.C. 0.5%	1	Turfgrids 0.3%	2	DuPont S.C. 1%	22.5
		Turfgrids 0.5%	1	Nike Heavies	1	Netlon 0.3%	6			Netlon 0.3%	23.3
		Lower		DuPont S.C. 3%	2	Netlon 0.5%	6			Nike Light	23.4
		CONTROL									
		Higher									
		DuPont S.C. 0.5%	1	Netlon 0.5%	2	Sportgrass	6			DuPont S.C. 0.5%	24.4
		Turfgrids 0.5%	1	Turfgrids 0.5%	2	Turfgrids 0.3%	6			Nike Heavies	24.5
		Netlon 0.5%	5	Nike Lights	5	Turfgrids 0.5%	6			**CONTROL**	29.4
				Sportgrass	5					1sd	3.0

when compared to the control.

The addition of Netlon significantly increased surface hardness on all rating dates over the two year study. The 0.5% rate produced a bulk density that measured significantly higher than the control on five of the six rating dates.

Overall, Netlon had no consistent effect on traction, infiltration, turfgrass density, or soil water content under the conditions of this study.

Nike Light and Heavies

These two products produced similar results for some of the properties measured and different results for others. They both reduced soil bulk density on five out of the six rating dates and both showed greater wear resistance than the control on over half of the rating dates.

Sportgrass

On average, Sportgrass reduced divot size more than any other treatment.

Sportgrass was the only treatment to measure higher in traction than the control. On the Oct. 18, 1996 rating date, Sportgrass measured higher in traction than all other treatments on the high wear plot.

Sportgrass was significantly higher in surface hardness than the control on all six rating dates and had a lower soil water content than the control on five rating dates. It also had a lower turfgrass density than the control on three rating dates.

Turfgrids

Turfgrids 0.3% and 0.5% both reduced divot length after wear was applied. Turfgrids 0.5% was the only treatment to reduce divot length, compared to the control, when no wear was applied. Both Turfgrids treatments measured higher in soil water content on over half the rating dates. In 1996, Turfgrids 0.5% had an infiltration rate higher than the control.

Both of the Turfgrids treatments tested higher in surface hardness than the control on all rating dates. The Turfgrids 0.3% had lower traction values than the control on two out of the six rating dates.

Turfgrids had no consistent effect on soil bulk density or turfgrass density.

Andrew S. McNitt and Peter J. Landschoot are both members of the Turfgrass Science team, Department of Agronomy, Pennsylvania State University

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By John Neylan [Manager, Technical and Advisory Services, AGCSATech]

SOIL WATER & DISEASE TESTING

The diagnostic services offered by AGCSATech are well underway and there has been a steady stream of soil, water and disease samples going through the system with samples coming in from golf clubs around the country.

When using the AGCSATech laboratory services, make sure that the nutrient samples are sent directly to the laboratory using the pre-addressed mail bags. If you don't have one, or if you need more, contact AGCSATech on (03) 9886 6200. For water, disease, nematode and soil samples requiring physical analysis, please send the samples to the AGCSA's office.

The consulting side of the new division is also taking off well. If you need any support with planning, project management or trouble shooting, please get in touch.

DISEASE OF THE MONTH

Over the winter months there has been several disease samples examined from 328 couchgrass greens and the disease organism common to each of these has been Leptosphaerulina sp which causes a leaf blight.

The symptoms can occur as a uniform blight or the turf may appear patchy due to pockets of more heavily infected grass. Individual leaves generally die back from the tip and may have uniform yellow to brown lesions extending down the leaf blade. The leaf eventually becomes a bleached white colour and often resembles frost damage or dull mower injuries.

Leptosphaerulina is a common soil saprophyte and colonizes weakened or senescing tissues of many different plant hosts. This disease usually occurs when the turf is under stress e.g. due to herbicide application, very dry or cold soils, mower damage on dormant turf, shade or presence of other more pathogenic fungi. In the most recent cases, the primary causes of the turf problems were excessive thatch (excess moisture in thatch), shade and root damage caused by Rhizoctonia sp.

Control is generally achieved by correcting the conditions that have placed the plant under stress. If a fungicide has to be applied a contact fungicide is usually sufficient

Reference:

Compendium of Turfgrass Diseases by R. Smiley

Bentgrass evaluation and selection trial is being planted this spring at the AGCSA Trial Site - Kingston Heath Golf Club

SOIL PHOSPHORUS

With the recent soil testing there have been queries from several Golf Course Superintendents as to why the phosphorus levels had increased over the past few years when they had applied little or no P in that time.

Most soil tests measure plant available P (using either as Olsen, Colwell or Bray tests), however, as a check on these soils, the total soil P was measured as well as the available P. It is interesting to note that in many situations the total P is quite high and is probably acting as a continuous source of available P.

The P cycle in soils comprises of several interacting pools (see diagram). The soil solution is the immediate source of P to the plant roots and the rhizosphere is the zone in which the interaction between the plant and soil solution occurs. As the inorganic P concentration is depleted by root uptake, P is replenished from other pools such as the adsorbed phase on mineral surfaces. The plant roots take up P in the orthophosphate form and any organic P must first be mineralized by extracellular phosphatases (enzymes) before uptake can occur. The phosphatases can be either of microbial or plant origin. Soil factors in the rhizosphere, such as CO_2, pH, enzyme activity and cation and anion activity all affect these processes.

The particular pool of P depends on the form of P applied and the soil conditions (i.e. pH, moisture, temperature). When P is applied as say superphosphate, it immediately reacts with the soil to form various insoluble compounds. At pH > 7, P reacts with $CaCO_3$ to form Ca-P compounds whereas on acid soils, Fe and Al-P complexes are formed. Ca-P forms provide more available P than do the Fe and Al forms. The organic form of P can be considered as a "slow-release" form and becomes available as the organic compounds are broken down by microbial activity.

In considering how this relatively high pool of total P was established in putting greens, it is most likely related to the original construction. The sources of P are associated with organic amendments, starter fertilisers and high rates of fertilisation during the grow-in phase. Following the establishment of the turf, these P levels can be sustained by low rates of P fertilisers, organics, breakdown of plant material and possibly P in the water source.

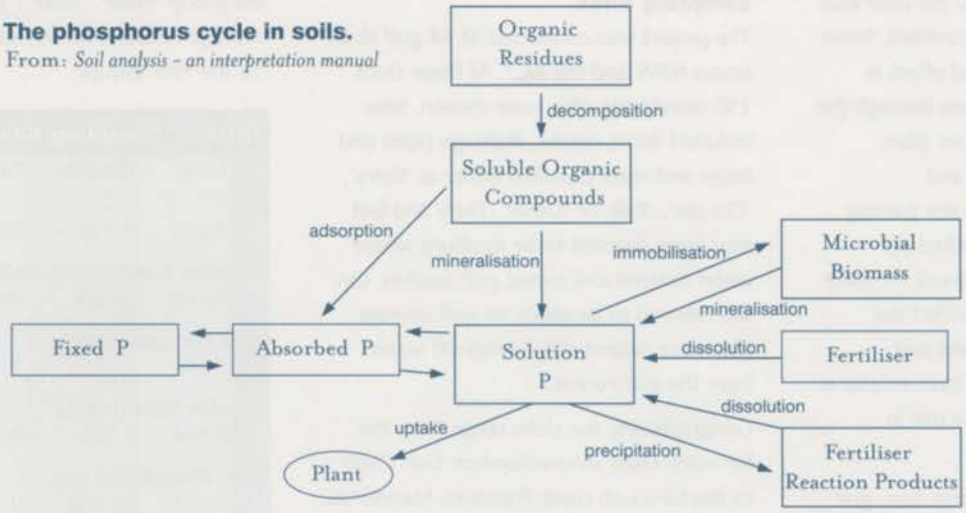
Research over the past few years would indicate that only relatively low levels of soil P are required to sustain healthy plant growth and that a relatively large pool of P can be established very early on in the life of the green. This can be checked and monitored by annual soil and plant tissue testing.

References:

Soil Analysis: An Interpretation Manual, 1999 CSIRO.

Per Comm; Dr. Bob Carrow, University of Georgia.

The phosphorus cycle in soils.
From: *Soil analysis – an interpretation manual*



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Preliminary Survey: *Water Quality on NSW Golf Courses*

By Jyri Kaapro

SUMMARY

Concern has been raised over the potential environmental affects arising from various golf course management practices. One of the concerns has been the potential for golf courses to cause water pollution from the fertilisers they use. To conduct a preliminary investigation of this issue a project was initiated to examine water quality on golf courses.

From 1996 to 1999 over 1300 water samples were collected from 110 sites at 44 golf courses in New South Wales and the Australian Capital Territory. The water samples were analysed for their phosphorus and nitrogen concentration.

Results from the project show that many golf courses receive highly polluted stormwater from their surrounding catchments. This is especially the case with golf clubs in the urban environment. Some golf courses have a beneficial effect in cleaning this water as it passes through the golf course. Often golf courses have extensive areas of wetlands and waterways. Polluted stormwater passing through these systems is purified by sedimentation and other nutrient stripping processes. To maximise this effect the systems must be well designed and managed. Golf courses also have extensive well grassed areas that play a role in trapping water pollutants.

To minimise nutrient water pollution, golf courses must have management practices that minimise the risk of nutrients entering waterbodies and waterways. This involves consideration in selection of fertiliser types and application method, environmental conditions and irrigation practices.

INTRODUCTION

Golf courses are very visible, intensively managed green spaces in urban environments. There have been suggestions that they are significant polluters of waterways due to perceived runoff and leaching of pesticides and fertilisers.

In response to this public perception, and the fact that no Australian data was available, discussions in 1995 between the NSW Golf Course Superintendents Association (NSWGCSA), the NSW Golf Course Secretary Managers Association (NSWGCSMA) and the Australian Turfgrass Research Institute (now Turfgrass Technology) led to the inception of this water monitoring project.

PROCEDURE

Sampling Sites

The project was conducted at 44 golf clubs across NSW and the ACT. At these clubs 110 monitoring sites were chosen. Sites included dams, creeks, drainage pipes and bores and were classified either as 'Entry', 'On-site', 'Exit' or 'Other'. Entry and Exit sites were deemed to be locations where water entered and exited golf courses. On-site referred to locations on golf courses that were subject only to run-off water from the golf course.

Geographically the clubs range from the far-north coast (Murwillumbah Golf Club) to the far-south coast (Pambula-Merimbula Golf Club) and inland to the ACT (2 clubs) and the central west (Gunnedah Golf Club).

Clubs were asked to provide details of fertiliser usage and rainfall over the duration of the project

Sampling and Laboratory Analysis

Samples were generally collected by the principal investigators then analysed by a NATA registered laboratory for 6 parameters;

- pH
- Electrical Conductivity (mS/m)
- Total nitrogen (mg/L)
- Total phosphorus (mg/L
- Filtrable NOx (nitrate and nitrite) (mg/L)
- Soluble reactive phosphorus (mg/L)

RESULTS

Over 3 years a total of 1354 samples were collected. These were divided into the four categories shown in Table 1. In the entry group there was 315 samples, 560 were on-site, 331 were exit and 148 samples in the group 'other'. Table 1 shows the average results from the laboratory analysis for the four groups.

Table 1: **Sampling Site**

	Entry	On-Site	Exit	Other
pH	7.06b	7.21a	6.95b	7.30a
Electrical Conductivity (mS/m)	56.9b	62.8b	46.9b	712.0a
Total Nitrogen (mg/L)	1.64a	1.41ab	1.19c	1.20bc
Filtrable NOx (mg/L)	0.59a	0.29b	0.35b	0.36b
Total Phosphorus (mg/L)	0.293b	0.128d	0.167c	0.547a
Soluble Reactive Phosphorus (mg/L)	0.059b	0.036c	0.091b	0.426a

Average nutrient levels in Entry, On-site, Exit and Other samples.
Means followed by the same letter do not significantly differ (P<0.05)

DISCUSSION

Water Nutrient Levels

The ANZECC Australian Water Quality Guidelines (1992) give some interpretation guidelines that the data from this project can be examined with. The Guidelines are currently being reviewed and significant changes in relation to nutrients in water are proposed. The 1992 guidelines give the following detail on pH, electrical conductivity, nitrogen and phosphorus concentration.

In this project the average pH for each of the four categories was approximately 7 (Table 1). This neutral pH is within the ANZECC guideline range for freshwater rivers and streams of 6.5 to 9.0.

The Entry, On-site and Exit categories of samples have an average electrical conductivity below the ANZECC guideline for freshwater rivers and streams of 150mS/m. The category 'Other' has quite a high average electrical conductivity level. This higher reading is due to the influence of seawater at several coastal golf clubs.

The average total nitrogen levels for all categories exceed the ANZECC range for both freshwater rivers and streams (0.1 – 0.75 mg/L) and freshwater lakes and reservoirs (0.1 – 0.5 mg/L). The Entry category had the highest total nitrogen level. With many of the golf clubs in urban catchments the result reflects the general stormwater pollution problem these catchments have. At many golf clubs the Entry site had significantly higher total nitrogen levels compared to the Exit site. This is reflected in the lower average total nitrogen for the On-site and Exit categories.

Table 2.	pH	E.C. mS/m	NOx mg/L	Total N mg/L	Soluble P mg/L	Total P mg/L
Freshwater						
Rivers & Streams	6.5 - 9.0	< 150	n/a	0.10-0.75	n/a	0.01-0.10
Lakes & Reservoirs	"	"	n/a	0.10-0.50	n/a	0.005-0.05
Marine Waters						
Estuaries & Embayment	< 0.2 unit from norm.	< 5% from norm.	n/a	n/a	0.005-0.015	n/a
Coastal Waters			n/a	n/a	0.001-0.01	n/a

Carefully designed and managed golf courses can play a significant role in the improvement of stormwater quality.

The average filtrable NOx levels reflect a similar pattern to the total nitrogen results. Generally speaking, the results are quite low but the ANZECC guidelines do not provide interpretative data for comparison. However, the nitrate level for drinking water is 50mg/L (Australian Drinking Water Guidelines, 1996).

The average total phosphorus level for all categories exceeded the ANZECC guideline range for freshwater lakes and reservoirs (0.005 – 0.05mg/L). The range for freshwater rivers and streams is higher (0.01 – 0.1 mg/L) and when comparing this with the On-site and Exit categories, they are close to the high end of the range. As with total nitrogen, the Entry category had a significantly higher average than the On-site and Exit categories, again reflecting the generally poor quality of urban stormwater. The category 'Other' had the highest average total phosphorus level. This was due to the influence of effluent water samples at some golf clubs using this water for irrigation.

The average soluble reactive phosphorus

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levels for the four categories do not show the same pattern as the total nitrogen, NOx and total phosphorus results. The Exit category showed a higher average than the Entry and On-site categories. This may indicate some input of fertiliser phosphorus from golf courses. The ANZECC guidelines only have soluble phosphorus guidelines for marine waters.

The results have generally shown that water entering golf courses is quite polluted, especially when the golf course is in an urban catchment. At many golf clubs there appears to be significant improvement in polluted water that enters the golf course. Golf courses are generally well grasses areas with wetlands and well-vegetated streams and creeks. These ecosystems have the potential to improve water quality through nutrient stripping processes.

A small number of golf courses continually measured elevated phosphorus readings in dams subject to on-course runoff only (On-site sampling category). These clubs could be classified as being of relatively recent construction. The elevated phosphorus readings may be a legacy of the period when the golf course was under construction, or from nutrient release in sediments in the water body. An examination of fertiliser practices as well as the analysis of sediments in these water bodies is suggested to those golf clubs.

CONCLUSION

This project has demonstrated that run-off, entering golf courses is often found to contain very high nutrient levels. Golf courses can play a role in improving the quality of stormwater as often they have significant water features (dams, creeks, wetlands etc.) through which stormwater passes and is stripped of pollutants. These wetland systems require careful design and management.

Golf courses have the potential to cause water pollution but, if fertilisers are used carefully and other management practices are adopted, extensive research from the Unites States indicates that the potential to cause water pollution is significantly reduced.

In this project golf courses that measured elevated water nutrient levels were generally those constructed most recently. The readings may therefore be a residual effect of soil disturbance.

Monitoring is an important part of environmental management and it has been encouraging to note that most golf courses involved in this project are continuing their monitoring programmes. This is in addition to their normal extensive soil monitoring and other water monitoring activities.

With many golf courses located on natural sand profiles the issue of groundwater pollution is significant. High infiltration rates and the poor nutrient and pesticide retention characteristics of sands increases the possibility of groundwater contamination. Golf courses in these locations should consider the implementation of groundwater monitoring programmes.

At the time this work was published, Jyri Kaapro was a Senior Research Officer with Turfgrass Technology Pty Ltd.

A complete copy of this report can be obtained by contacting the Horticultural Research & development Corporation: Phone (02) 9418 2200

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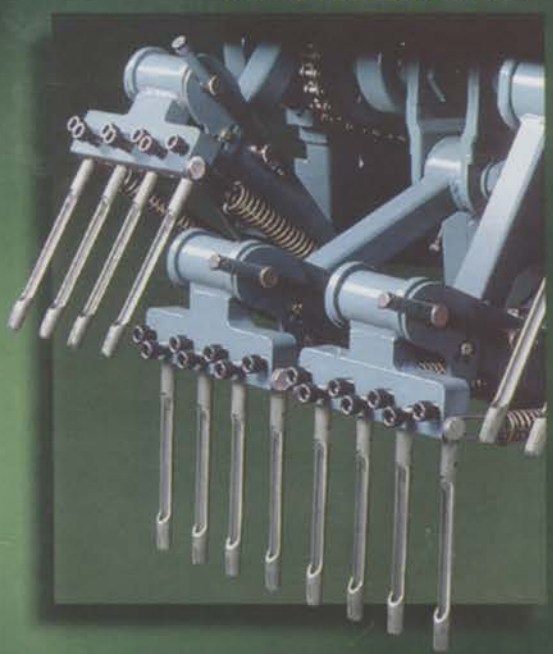

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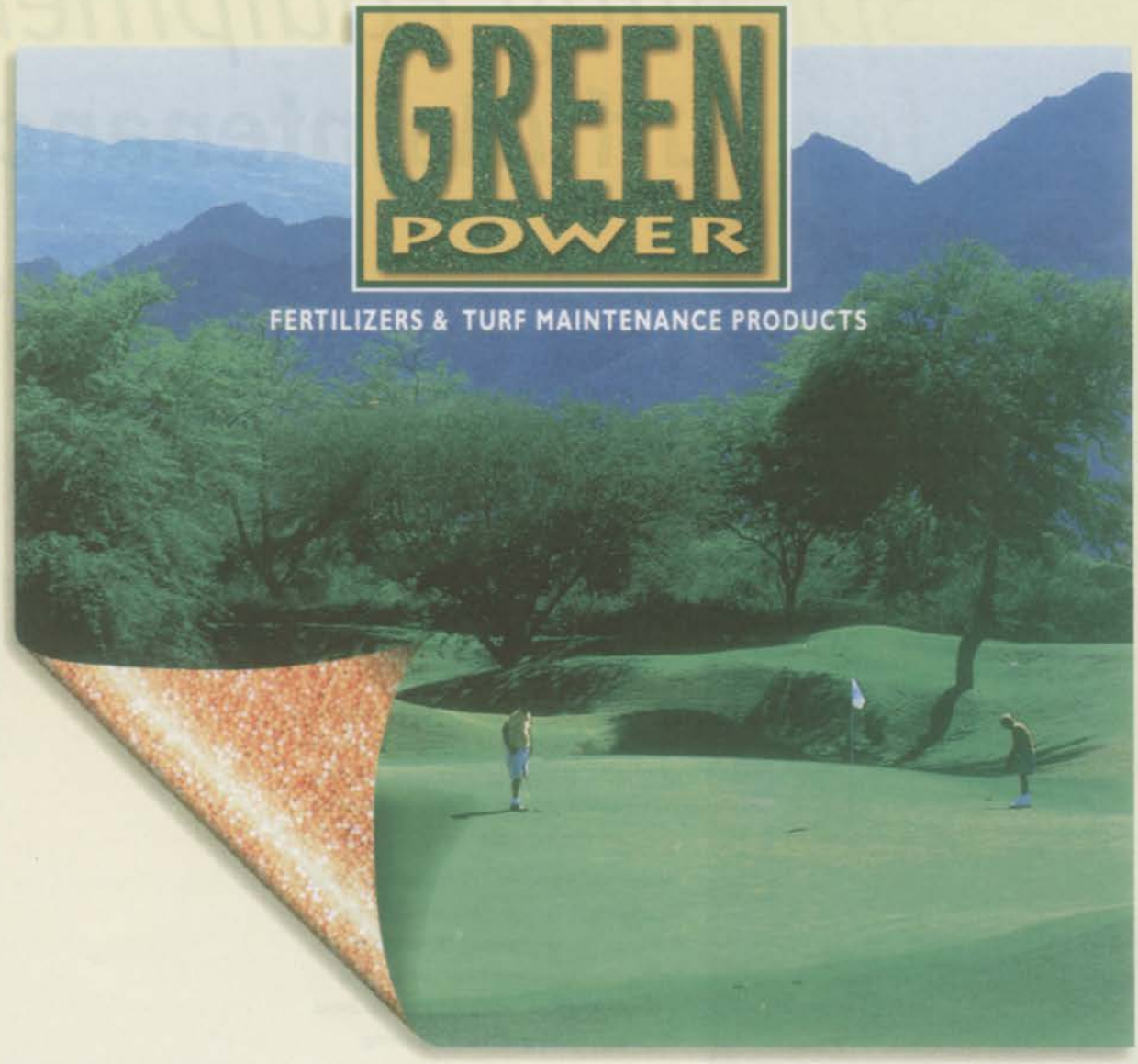

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Spraying Equipment for Turf Maintenance

By David Carr

When selecting spraying equipment for turf maintenance several factors need to be taken into account. The extent of the area to be sprayed will have a bearing on the size of the tank which is chosen, as will the size and horsepower of the available tractors. Also, consideration needs to be given to the width of the spray boom to ensure the spraying operation is carried out efficiently. If the boom is too wide for the application then damage could be caused to the turf surface or to the boom itself. Outrigger wheels on outer boom sections can help in preventing damage on undulating surfaces. Spray booms are available with multi-outlet nozzle holders that allow nozzle types to be changed in a matter of minutes. Nozzle tips themselves are now colour coded according to flow to minimize any confusion in nozzle selection.

Wheel equipment for turf applications should be chosen to minimize any impact on turf surfaces. The tyres should be wide and flat with a non-aggressive tread pattern and preferably with rounded shoulders to avoid digging in to the turf when cornering.

The pump on any spraying equipment is the

heart of the machine. Several types are available, the most common being diaphragm, piston or centrifugal. Most pumps are driven from the power take off of the tractor, but they can be engine driven or hydraulically driven from the tractor. One advantage from a safety point of view with hydraulic drive is the removal of the power take off shaft which, is replaced by a hydraulic motor. There is then no opportunity for operator's clothes to become tangled in a spinning shaft with disastrous consequences. Another advantage is the extra flexibility, allowing the sprayer to be towed by several different tractors without having to worry about adjusting the power take off shaft for each one.

The capacity of the pump is an important consideration. The pump must be capable of delivering the maximum flow required by the spray boom and must also have capacity in reserve to provide agitation for the chemicals in the spray tank. Venturi and mechanical agitation systems can also be used to prevent chemicals settling in the tank. Sprayer control systems range from manual taps to electric solenoids or ball valves, right through to computerised automatic rate controllers. Hose reels with hand operated spray guns for applying liquid fertiliser are often fitted to turf spraying equipment for extra flexibility.

As with any spraying equipment and equipment in general, maintenance is vital to ensure a long and trouble free life. The most important maintenance procedure is to thoroughly wash out spraying equipment after use. Components should be flushed out several times with clean water to remove any chemical residues from the machine. There are various types of boom cleaning chemicals that can be used to assist with flushing operations. Maintenance of boom components should focus on all pivot points: mounting brackets, suspension systems and nozzle bodies. Nozzle tips should be constantly checked for damage, correct placement on the boom and even spraying pattern. The boom and nozzles should be checked for correct calibration 2-3 times per year and any nozzles which fall outside the manufacturer's specifications should be replaced. Pumps and plumbing lines need to be checked for leaks, damage and wear from both an efficiency and a safety aspect. A burst hose or a leaking pump could cause significant damage to a turf surface or more importantly to the sprayer operator.

Future developments in spraying technology will probably involve more accurate monitoring and controlling systems. Nozzle flow rates may be controlled electronically to apply the chemicals more accurately. Data logging attachments for computerised rate controllers are now available. These data loggers allow the sprayer's control system to be programmed from a personal computer. The sprayer will then operate according to those instructions. At the end of the spraying period the data logger can be down loaded into a computer and all the spraying details can be analysed with the aid of printed reports and graphs. This allows very accurate records to be kept for all spraying operations. A further development of this technology will be to incorporate Global Positioning Systems (GPS) and satellite tracking to monitor where the spray machine is at any particular time. This technology will also be able to control the sprayer to turn on and off according to a GPS generated map. A GPS guidance system also removes the

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As seen at the Millenium Turfgrass Confrence Melbourne, June 2000

*Pictured: 2000Lt. Turf Sprayer**

*Pictured: 400Lt. Side Mount Turf Sprayer**

*Pictured: 400Lt. Tray Mount Turf Sprayer**

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need for a foam marker as the sprayer will track according to the width of its boom as it will be directed by the satellite.

Future technologies may allow spraying of specific weed areas according to their infra-red signature. Infra-red sensors on the sprayer would identify certain weed species and would then activate the appropriate nozzles to apply herbicide only to those plants. Spraying to this level of accuracy would certainly maximize the effectiveness and minimize the usage of chemicals in turf management.

David Carr is a Product Manager with Silvan Pumps and Sprayers

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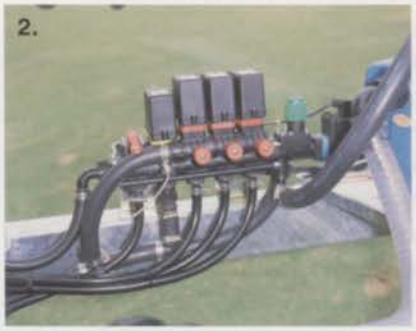
3. Flotation turf tyres should be fitted to all spray equipment to minimize turf damage.

4. Hose reels with hand operated spray guns for applying liquid fertilisers are often fitted to turf spraying equipment for extra flexibility.



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Summer Stresses, Weeds and Selected Maladies.

By Peter H. Dernoeden

Any book promising to specifically tackle the issues of creeping bentgrass management is bound to catch the attention of any Golf Course Superintendent. The eternal quest of finding that "magic something" that will make our lives easier or our greens superior is what keeps us motivated.

And so it was with enormous expectation that I began studying the work of Dr. Peter H. Dernoeden, whose background in turf dates back to the early 1970's, and has culminated with his Ph.D. in Plant Pathology and appointment as a turfgrass agronomist at the University of Maryland.

The over-riding focus of the book is stress management for creeping bentgrass, both avoidable and unavoidable. His observation over many years that most summer decline in creeping bentgrass is a result primarily of stress (abiotic and biotic) rather than disease is constantly emphasised throughout the book, and serves to challenge the reader to continually consider causal factors rather than just symptom treatments.

Topics covered systematically throughout the book include cultural practices for summer stressed greens and detailed discussion of selected stresses and maladies of creeping bentgrass. These include shade, plant parasitic nematodes, algae and moss, black layer, numerous diseases, and a helpful section on phytotoxic effects of fungicides and interaction with plant growth regulators. Importantly, there is some interesting discussion of biological approaches to disease management and new generation fungicides that are of microbial origin.

Of particular interest to Superintendents throughout southern Australia is the covering of Poa annua control in both the sections on herbicides for bentgrass, and the use of plant growth regulators on golf courses.

Generally the book is quite easy reading, with Dr. Dernoeden's style quite frank, almost as if you are reading from a daily journal of his observations, although there are times when the reader may feel as though they are reading an extract from a product label. Each topic covered is usually followed by a summary of key points, which are extremely useful when looking for a quick reference or "memory jogger".

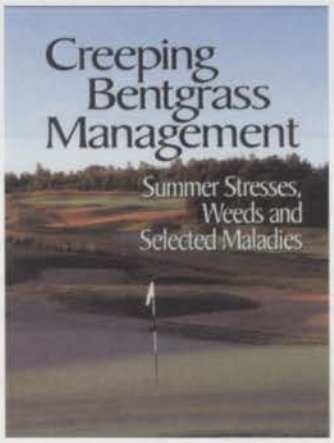
His writing reflects his close working with Superintendents over many years, as it is refreshingly straight forward for the most part, with numerous practical reminders and "hints" along the way.

Being an American publication, there are numerous references to products that are not available in Australia, but given the amount of American literature we are all exposed to now through journals or the Internet, most of the names are familiar. Therefore, these references could be seen as noteworthy for future consideration, rather than dismissed as irrelevant.

$115.50 +GST

Because of its practical style, "Creeping Bentgrass Management" has something to offer Superintendents and Turf Managers of all levels of experience, and would be a worthwhile reference to include in any turf library.

Daryl Sellar M.Agr (Turf Mgt)
Golf Course Superintendent
Glenelg Golf Club, SA



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Profile

Another Legend is Made

BY MARTIN BREEN

The W.S.Cox plate is considered by many as the most prestigious race on the Australian racing calender.

Sunline, 1999 Cox Plate winner.

Run at the end of October during Victoria's Spring Racing Carnival, The BMW Cox Plate is the Australasian thoroughbred championship and premier weight-for-age race. In April 1999, it was chosen alongside the world's most elite horse races as Australia's representative in the exciting new Emirates World Series Racing Championship.

It has carved a reputation as the race "where legends are made". Living legends like 1998 winner Might and Power, and greats of the past such as Phar Lap (1930/31) and Tulloch (1960) each have a place in the history of this great race.

Fortunately, good growing conditions at this time of the year make preparations a little easier, however with October being the wettest month of the year there is always a fair chance of rain.

The track is a sand-based construction reinforced with Reflex® mesh elements. The profile consists of a 260mm deep sand rootzone, the top 150mm of which is amended with 10% peatmoss and mesh elements. The drainage layer is 100mm deep with 5mm blue metal and drainage pipes approximately 6-8m apart. The grass type is a mixture of rye and bluegrass.

It was constructed in late 1994 and was first raced on in October 1995. It is the only racetrack of its type in Australia. Based on U.S.G.A. specifications, the profile offers reduced surface hardness, extended track life expectancy superior drainage, and reduced loss of meetings due to bad weather.

Some renovation work was carried out in early spring to control thatch levels. This work is determined by the level of damage through the winter, when root growth is poor and how well it recovers from racing over this period. We know that the track improves as the soil temperatures increase in September but most of the renovation work is restricted until after the Cox Plate.

The final week of preparation is very demanding, Tuesday morning gallops for more than 40 horses, Thursday night races and various other functions, all scheduled as a lead up to the Cox Plate on Saturday 28th October.

I have made a decision this year not to go with a slow release fertiliser on the track, but to monitor the performance of the turf closely throughout the year and apply nutrients as required.

To assist with the leaching of sodium salts accumulated through the use of poor quality irrigation water, additional applications of calcium were made. Potassium, manganese, and copper have also been applied to correct deficiencies. Over the last 12 months we have successfully lowered nitrogen levels to avoid excessive top growth. However, a final application of Nitro-Iron (14%N & 13%Fe) at 300 mls /100m^2 will be applied 6-7 days prior to the event. The use of soil sensors that determine total EC levels, soil temperatures and moisture levels at various depths assist in water management and fertiliser programs, particularly in terms of nutrient leaching.

Turf is maintained at 75mm with the final cut done on the Tuesday, after "Breakfast with the Best." Depending on the whether, a decision will be made as to whether the rail is moved after the Thursday night meeting. Rail moves are a controversial issue in the industry, but I believe they are essential due to our heavy racing schedule (33meetings a year). The track is rolled on the Wednesday, to achieve a pattern and further consolidation. It is rolled again on Friday, after the track is repaired from the Thursday night meeting. Our aim is to have the rated track as "Good". Penetrometer readings will assist in obtaining an accurate rating, which is so important for owners, trainers and punters.

Extra staff will be engaged for the night meeting and for repair work on the Friday to ensure that all preparations are completed for Saturday when another "Legend is Made"

Martin Breen is the Racecourse Manager at the Moonee Valley Racing Club.

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Internet: www.cs.aventis.com.au *Chipco and Ronstar are registered trademarks of Aventis *Dimension is a registered trademark of Rohm & Hass AES333MS/ATM/The Hopkins Part.

Industry Icons Honoured

Established by the Commonwealth Government of Australia as a commemorative medal to celebrate Australia's sporting achievements, 20 turf industry icons have been honored by an Australian Sports Medal.

The minister for Sport and Tourism, Mrs Jackie Kelly invited the Australian Golf Union to provide her department with nominations for the award. It was via the AGU that the Australian Golf Course Superintendents Association (AGCSA) was asked to nominated 20 people who had made an outstanding contribution to Australian sport through their service to the Australian Sports Turf Industry.

Those honored with an Australian Sports Medal were;
Douglas Robinson, Peter McMaugh, John Neylan, Terry Woodcock ,William Hopkins, Winston Church, Gwilym Powell, Neil Adams, Peter Martin, Wayne Hinton, Peter Frewin, Peter Sawyer, Raymond Keane, Geoffrey Hatton, Trevor Strachan, Horold (Dene) Goldsack, James (Jim) Porter, Wayne Marland, Craig Pearson, John Spencer

Textron appoints Squiers

Textron Turf Care are pleased to announce the appointment of Squiers Sales & Service of 1069 Green Hill Road, Summerton, Adelaide Hills 5141 as their new Textron Turf Care Group Distributor for South Australia. Squiers are a long established family business led by Mr Darryl Squiers. They can be contacted by phone on (08) 8390 3017, fax (08) 8390 3404 or via e-mail: squiers@sanet.com.au

All South Australian enquiries regarding their Cushman, Ransomes and Ryan products should be directed to Squiers, but please do not hesitate to contact Rex Weston on 1800 80 1980 if you require any further details.

TEXTRON

Industry identity will be missed

Known and respected by many in the turf industry, Steve Valkenburg passed away recently. Involved for over 30 years as a sales representative for turf products. Steve called on Golf and Bowling Clubs and Councils for Companies such as Yates, Lanes, Amalgamated Chemicals, Forrests, and after starting up Chemturf's operations in Victoria in 1979, he retired in 1991. His friendly nature was before mobile phones and computerization. Giving product advice, his knowledge and friendly manner ensured his regular calling was enlightening, caffienated and longer than intended to those who admired him. I am sure the entire turf industry would offer condolences to his wife Rosemary and Family.

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Postcards from the Uxbridge

The TGAA (Vic) has established a partnership with a cricket club in England that will see a member who is selected by the committee have a wonderful experience under English conditions.

Dale Goodman from Hailebury College Melbourne worked at Uxbridge Cricket Club whilst on a working holiday and they were so impressed with the standard of Australian work that they approached us for this ongoing partnership.

The following is the first report from our inaugural ambassador for the TGAA Toby Lumsden.

Arriving in London, at Heathrow Airport on the 29th March, I was greeted with temperatures of 4°C. With 5 days before I started work, I was sent diving into my case to find my gloves and beannie!

Preparing for the first cricket match on April 22, things weren't going well. The weather had been terrible. It was cold, wet and even snowed on two occasions. With two cricket tables to prepare, a bowling green, three turf tennis courts and a rugby pitch, none of which we were able to be cut for a week, work was starting to bank up.

Due to a shortage of covers and two tables to keep dry, damp wickets were played on early in the season. However, the summer is bringing better weather and as the wickets begin to dry out and harden, better scores are being made.

The tennis season didn't start until the middle of May and by then the courts were still a bit soft. Eventually we were able to get the heavy roller onto them. Courts are double cut twice a week at 10mm, and marked out.

Although the bowling green only has 6 rinks, it is played on every day. Being cut at 5mm, and rolled once every two to three weeks, they never seem to play above 12 to 12.5 seconds. This one being one of the best in the Borough (Borough of Hillington). When the green is soft, dumper mats are pegged into the ground where they stay for the duration of the game, and are played over.

Rugby season finished in early April and the pitch needed a good renovation. The pitch was Verti-drained, top dressed with 60 tonnes of sand and sown with 200kg of Rye Grass. This should see it in good condition for the start of the next season.

With this summer being the worst on record, the bowling green and tennis courts have been watered only once this season. The first three months has certainly been a great experience; learning new machinery, terminology and seeing different ways of doing things, has broaden my knowledge. I look forward to bringing these new skills back home to put them through a real test.

Look forward to seeing all you turfies soon

Toby Lumsden

Those TGAA(Vic) Members interested in nominating for this position in England for next Winter please contact Simone at the TGAA office for criteria.

Photos supplied by Dale Goodman

Better scores were made once the wickets dried out.

Bowling Greens never seem to play above 12 to 12.5.

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Effective, reliable selective weedkiller which controls: Paspalum, Summergrass, Mullumbimby Couch, Crab grass, Sedges and the dreaded Nut grass.

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DSMA formulations have been getting better, more user-friendly. Barmac DSMA LIQUID was developed as a flowable formulation because of difficulties with wettable powder Products.

Now Barmac DSMA CLEAR takes a quantum leap forward. It is a CLEAR Solution. Known for their high quality, innovative products Barmac's DSMA CLEAR is Clearly Quicker, Clearly Easier and Clearly Better.

DSMA CLEAR is available exclusively from Globe Australia and its agents in all states, or call Globe Australia on: (07) 3255 6000.

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Companion has been extensively tested at renowned Universities across the U.S.A. to substantiate our claims. Michigan State and Rutgers are two of the Universities used in the trial work on Companion.

It has been tested on fungal diseases including Rhizoctonia, Anthracnose, Dollar Spot, Fusarium, Pythium, and Summer Patch. Companion reduced these diseases by 30% to 72% when used alone, and 96% when used in combination with a chemical at half rate.

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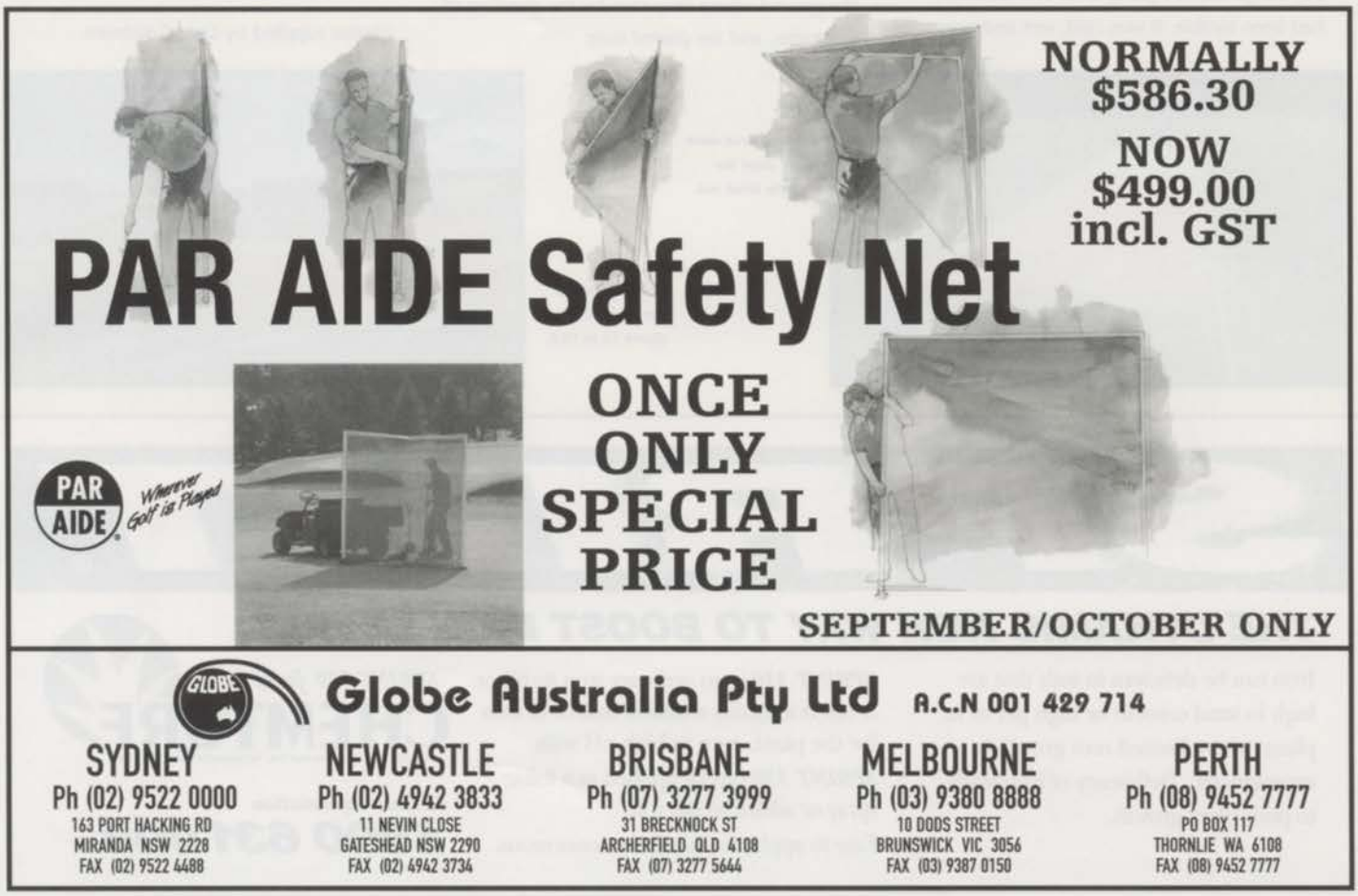
Companion is distributed by Oasis Turf, for further information call 03 9580 2488.



John Deere 1620 Wide-Area Flex Mower makes quick work of rough terrain

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For further information please contact your local John Deere Golf & Turf dealer or freecall 1800 800 981.

Broco Turf Tools

New from Broco Australia are these light-weight aluminium shovels that are available with either long or short Spotted Gum handles (sold separately). They are ideal for topdressing and renovation work and at only $55 including GST they are available at a substantial discount to their Sweedish competitors. Broco Australia are also pleased to offer their new 'hexagonal turf plugger'. Made from durable powder coated steel the plugger can hold up to 4 or 5 plugs at a time and comes with a hand tool that ensures plugs are of a uniform depth. However, the greatest benefit of all is the fact that the tool allows small areas of turf to be replaced quickly and easily and without the gaps left by circular turf pluggers.

Distributor enquiries are welcome and for sales or further information, please call Broco Australia on (07) 3351 6196Broco Turf Tools

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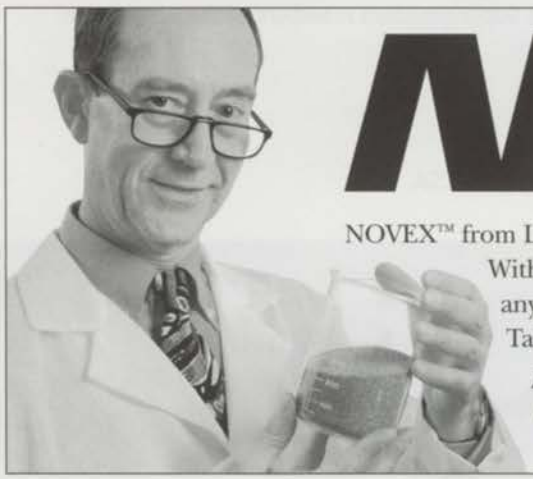
"We decided to trial the Trelleborg low floatation turf tyres and our experience with them has been so good that we are moving to make them standard 'footwear' on all our six tractor mowing fleet" – Mike Green (Hume Turf & Machinery)



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To join the associations your application must be signed by two current Golf Course Superintendent members of the association.

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A T M

The Golf Course Superintendent job market has certainly opened up again in recent months with the AGCSA advertising several positions in all states. Due to the fast turn around times required by employers, these job vacancies are generally mailed out direct to AGCSA members within three days. However, some employers ask us to post it on our web site only. It is therefore advisable to check our web site regularly if you are looking for a new position.

The AGCSA and Aventis have joined forces to present a joint roving workshop series in October. "Turf Insect Pests of Australia" will feature presentations from Dr. Rick Brandenburg, John Matthiessen and John Neylan. Dr. Brandenburg sits on the Board of the Entomological Society of America and is editor of their publication, Handbook of Turfgrass Insect Pests. He has spent over twenty years researching the major insect pests in turf and most recently has carried out extensive studies on the life cycles of mole crickets. Dr. John Matthiessen is a principal research scientist with the CSIRO. In recent years his research has focussed on the biology and management of soil-dwelling pest insects in turf, particularly in underpinning African Black Beetle control with a good understanding of its biology. John Neylan is well known to Australian Turfgrass Managers. He heads the AGCSA's Technical Services Division, AGCSATech.

Registration forms are available from the AGCSA office and have been distributed widely through both Aventis and AGCSA mail outs.

By the time you receive this magazine the first of the AGCSA's trial sites should be under construction at the Kingston Heath Golf Club. The first of the trial sites will involve a bentgrass evaluation trial and will also provide space for the AGCSA's National Bentgrass collection project, which is now also commencing. The AGCSA is pleased to have the support of the VGA, VGCSA, ANZGCSMA and AGU for these projects. Once established the trial sites will provide valuable comparative data for Golf Course Superintendents to assist in their decision making processes for choosing which bentgrass types to use for establishing new greens.

Peter Frewin

President, AGCSA

FNQGCSA

The last few months have produced some stunning weather in the north with cool mornings and temperatures rising to the high twenties by afternoon. At the time of writing this, there has been no rain for 37 days so irrigation systems are working overtime to keep moisture levels up.

With most courses in the north preparing for major greens renovations (September – October) we hope this fine weather will continue.

A meeting was held at Paradise Palms Golf Course with the Tropical Horticultural Trade Days Committee. After a full day of discussion, it has been decided that 2001 will be without the Townsville Trade Day. The decision was based on the disappointing attendance from Superintendents and staff and a lack of interest shown towards committee positions. However, the committee has decided to hold a trade day in 2002.

The next meeting to elect a committee (hopefully some new blood?) will be held in March 2001.

Best of luck to all Supers busy with renovations.

Paul Earnshaw

President, FNQGCSA

GCSAQ

As we have moved out of winter, the conditions up here have become very dry with extreme fire danger in many areas. During the start of September, the days suddenly became very hot with extremely strong north westerly winds bringing down trees and creating a severe bush fire problem along the coast south of Mackay. In the south east of the state we had weeks of smoke haze hanging over the countryside as vast areas of bush went up in flames and grass fires in urban areas threatened. The favorable dry, cool winter has led into an increasingly dry spring with areas inland from the coast already drought declared.

At our AGM there were some changes to the committee with Vern Jepsom leaving the treasurers position after many years of service for which the association is grateful. Vern has left the Brisbane Golf Club and will be replaced by Jeff Hegedus.

At Mudgereeba, the Glades G. C. is steadily approaching completion with an opening expected in December. Superintendent, Paul Bevan has stepped down from the GCSAQ to concentrate on this project and he is to be commended for his initiative in stimulating research efforts with the AGCSA, QGU and the DPI.

Coming on to the committee is Ben Tilley from Beerwah G. C. (2000 AGCSA Claude Crockford Award winner) and Kelly Hyland of RQGC. Rod Cook is now the Treasurer and VP Barry Cox will be responsible for the organisation of field days. Pat Pauli continues as our Education Officer, Danny Ryan is the Golf Captain and Greg Plummer is Secretary.

Around the state, plenty of reconstructions and renovation are underway. Horton Park has been rebuilding the 10th green, fairway and tee. The Northern Rivers has had a good winter with a hot dry spring, Lismore G. C. will be looking forward to an injection of funds from the Lismore Workers Club who are also now stakeholders in the bowls club. Out west, things are hotter and drier with the return of a more traditional seasonal pattern.

Finally, one of our most respected turf managers, Doug Robinson, has been honoured with an Australian Sports Medal, an award recognising his service to the golf industry and in particular his involvement with the formation of the AGCSA. Well done Doug.

John Pemberthy

President, GCSAQ

GCSAWA

After a relatively mild winter / spring season, supers in the west are hoping this trend continues through our summer.

The Margaret River Seminar in August was a huge success with over 60 delegates from the metro and country areas attending.

Congratulations to Paul Johnson of Chidley

Point who took out our golf championships and the Neil Adams trophy. Thank you once again to all of our sponsors and our speakers John Neylan from the AGCSA, Peter Williams of Peter Williams and Associates and all of our local superintendents that made themselves available to give presentations.

The Toro cup was held on the 26th September at the magnificent Manjimup Golf Club. It was good to see so many of our metro supers once again making the trip south to support this event.

The John Deere Super Series is now in it's final stages with the last event scheduled for November the 7th at Joondalup Country Club. We are looking forward for a good attendance.

The GCSAWA annual Christmas Party has been scheduled for December 15th at the Rosemount Bowl. All Members and their families will be invited to attend what promises to be another memorable occasion.

Rob Macdonald

President, GCSAWA

NSWGCSA

After one of the coldest and driest winters for several years, most course supers are eagerly awaiting the spring growth, which will see their courses come out of 'hibernation'

Many courses have reported record frosts over the past 2 months both in frequency and severity.

Those of us on clay based kikuyu layouts have had to either spend precious dollars on fungicide or watch the winter fusarium gradually grab hold of our fairways.

Many have seized the opportunity to commence drainage and construction projects.

The education / field day at Bankstown G. C. was well received by those attending. Many had their first introduction to "paramagnetic rock". Thanks to host superintendent Steve Brennan and our sponsors for the day, Agriturf and Boral.

Our AGM was held on Monday 28th August at Monash C. C. and it is hoped that the spectacular electrical storm that hit after the election of the new committee was not an omen.

The new look committee is as follows: Martyn Black, President; Kevin Wellard, Vice President; Richard Kirkby, Junior Vice President; Craig Eastern, Treasurer; Scott McLauren, Secretary; Merv Heywood, Field Days. A warm welcome to new board members; Brad Marsden, Mick Bradbury, Michael Waring and Guy Thomas.

To those standing down, special thanks to past President, Mark Parker for his professionalism and Tony Fogarty for 9 years of service to the association.

Thanks and congratulations to Marshal Howarth and the Monash C. C. and to Toro for their much appreciated sponsorship.

I urge any member of this association to contact any one of your Board Members with ideas, suggestions, news items, etc, we are here to represent you!

Our next field day is at Liverpool G. C. on 14th November, don't miss it!

Martyn Black

President, NSWGCSA

VGCSA

Warm season grasses was the theme at the VGCSA general meeting held on 14th August at Eagle Ridge Golf Course. Topics included; C4 Grass Selection and Assessment of Varieties, Management of Pure Couch Fairways, Management of Two Grass Fairways and Warm Season Grass Establishment.

Over seventy members we on hand to hear Phil Ford, Richard Forsyth, John Geary

Mark Shroeder and Tim Pearce present some good quality information whilst christening the impressive new Eagle Ridge clubhouse. Congratulations to Scott Balloch and his staff at Eagle Ridge for the terrific landscaping work they have done around the clubhouse area in addition to maintaining the course in good condition. Thanks to all the speakers, Eagle Ridge Golf Club for their hospitality and also Turf and Irrigation Services for providing breakfast in the fog.

The next VGCSA meeting is on Monday October 23rd at Long Island Golf Club. It will be a continuation of the warm season grasses theme , topics for the day are weed control in couch , insect and disease control in couch and couch nutrition. The day will commence with breakfast provided by Chemturf and a course inspection is scheduled as part of the day. I trust we will have a good roll up of members to make it another successful meeting.

Our final VGCSA meeting for this year will be held on Monday 11th December at Kooringal Golf Club. It is to be a twilight meeting commencing at 12.30 with golf, followed by the general meeting, dinner and a guest speaker to be announced.

Clayton Howell

Committee, VGCSA

SAGCSA

It has been a long wet winter in Adelaide with some golf courses recording more rain than they have had in over a decade. We are all in need of some sunshine.

As my first report as President, I along with all other member would like to thank past President Bob Dellow for all his hard work and commitment to the association. Also, congratulations to Bob on receiving the Distinguished Service Award from the industry at the annual Coopers Turf Seminar.

It is with great pleasure that I welcome Dene Goldsack back to the industry as Technical Sales Consultant to T-Link Turf services and congratulations to Dene for being awarded the Australian Sports medal for services to the golf industry.

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We say farewell to Kym (farmer Fred) McDonald from Oakbank G. C. who has gone to grow chooks for a living.

Tea Tree Gully G. C. will be hosting the Australian Colt Series in October. The Australian Amateurs will be at Glenelg Golf Course along with the World Left-handers Championships. Also involved with this competition will be Flagstaff Hill, Kooyonga and Westward Ho Golf Courses.

Our next meeting will be at Mount Osmond Golf Course on Thursday 21st September to inspect continuing course construction.

Shawn Standfield

President, SAGCSA

TGCSA

The TGCSA Annual General Meeting was held at the Mowbray Golf Club on the 16th August 2000.

The Elected Officer bearers were:

Phil Hill (President;)Steve Harris (Vice-President); Shane Knott (Secretary); Danny Gilligan (Treasurer); Steve Lewis, Clint Southern, Greg Newton, Harry Skledar (Committee)

I would like to thank the outgoing committee - Stuart Mathewson and Chris Hay for their input over the past twelve months and welcome Greg and Clint aboard. We were privileged to have Peter Frewin at our AGM to answer any questions that our members may have had in regards to competency training or any other related issues.

Also present on the day was Zichy Woinarski from the Amenity Horticultural Training Council. Zichy explained the process involved in employing an apprentice under the new training scheme.

A superb luncheon was followed by nine holes of golf. Ben Clarke showed all participants how easy this game of golf really is, by winning the Toro sponsored Trophies. Thanks to Allan Phillips, Neville Coulson, Shane Knott and Rod Lehpamer from Toro for sponsoring the day.

The next twelve months should be very exciting for our association. We plan to hold educational training and information days as well as some social events, on a much more regular basis.

The next seminar will be in conjunction with

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the AGCSA. John Neylan will be presenting a report on insect life cycles and controls and will also cover some of the environmental issues. All of these topics are relevant to our cool climatic conditions.

This day is set for 1st November 2000 at Pines Resort, Seven Mile Beach, Hobart. Buses will be provided on the day to encourage attendance.

Our annual trade day will be held on the 6th December and will be held at Port Sorell. Details will be sent in the mail.

Phil Hill

President, TGCSA.

TGAA (Vic)

Looking back over the year it is amazing at how far the TGAA has come. Not only in organizing the various events held but also establishment of a Strategic plan to map our direction into this new century.

The activities held during this term were patronized with enthusiasm. They contained quality content that was topical and enhanced sound turf management practice.

We encouraged sponsors to get behind these events, which they did, and we thank all of them for their continued support to the TGAA and the Industry.

Thes highlight was the Millennium Conference. Easily the most ambitious event staged by the TGAA, and one that I feel lived up to expectations. To all that helped with the smooth running of all our Events we thank you very much.

Other initiatives included:

- Uxbridge Cricket Club Placement Program
- Honorary and Life Membership
- Research Grant Opportunity for trial work
- TGAA UV Policy
- TGAA Buyers Guide
- "YOUR TGAA" and "Why be a Member" application forms
- AUSTEP Ryegrass Seed Trials
- Closer links with the other TGAA Chapters

None of this work could have been close to being completed without the totally professional work of our Admin Officer Simone Staples. Anyone who has had contact with Simone knows of the drive and enthusiasm she has. We appreciate all she has done for us over the past year and hope she is enjoyed a well-earned break in Mexico.

It has been a truly rewarding year at the helm and I feel confident that the TGAA is headed in the right direction. I thank the Committee for their commitment and guidance. It has been an honor to serve as President during the past, very fruitful year. I encourage all our members to support the Association by attending Events, buying from our Sponsors and getting involved in some way to help the TGAA continue to serve the Turf Industry.

I wish you luck in all your Turf endeavors

Robert Savedra

TGAA (ACT & Surrounding Regions)

The most interesting event in the last few weeks was the TGAA 9th annual AGM. It was good to see the increased recognition of the TGAA by those in the industry who attended and the new membership applications. It is with regret that I mention our president Bruce Davies had to stand down due to other commitments but will still be heavily involved in the association activities. Great confidence is held in our newly elected president Paul Janssens who was formerly our secretary. Paul was also presented with one of the two President's awards for his dedication and contribution to the industry. Recognition was given to his outstanding contribution to the industry. The other recipient of the award was Keith McIntyre who had the vision for a national body of the TGAA and whose help in organising seminars is greatly appreciated. Official Plaques were also presented to life members John Lloyd, John Clark and Albert Jacobs.

In recent developments, Sydney is well on their way to forming a division of the TGAA. The ACT TGAA will assist financially and will give organisational support when required. The expansion is fundamental to the development of an increasing strength within industry so anyone within the Sydney area is encouraged to join.

Due to the popularity of the mid-year seminar, the association is looking for suggested topics for next year so we can get the ball rolling. We have plans for some interesting speakers and suggested topics include; work cover, OH&S and plant nutrition.

Justin A K Haslam

Committee, TGAA (ACT)

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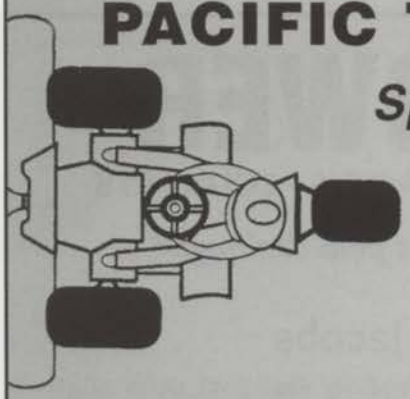

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