AUSTRALIAN
Turfgrass
MANAGEMENT

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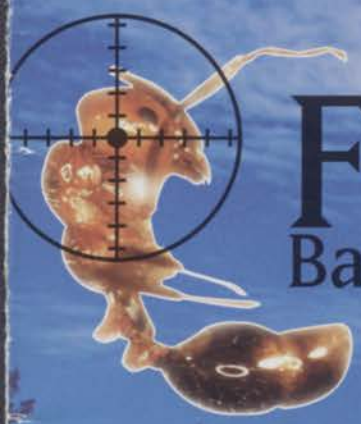


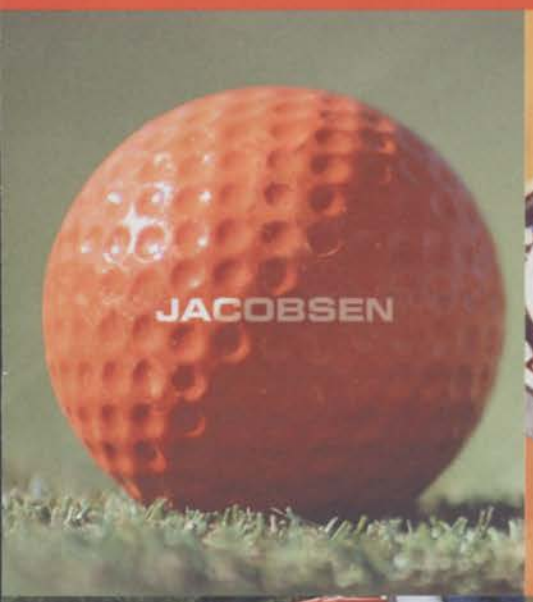
Fire Ants
Battle lines are drawn

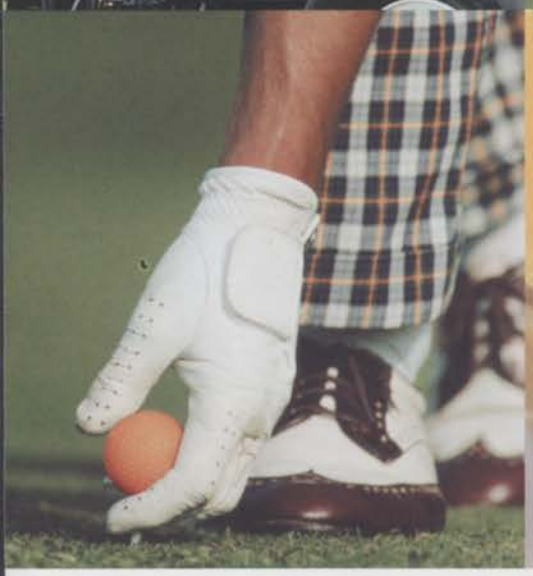
The Grand
Venue of the 2001 Holden Australian Open

Bentgrass
The Competitive ability of thirteen species of Agrostis Stolonifera

Cricket Wicket
Effects of Root Zone Construction and Preparation Methods

volume 3.5
October - November 2001





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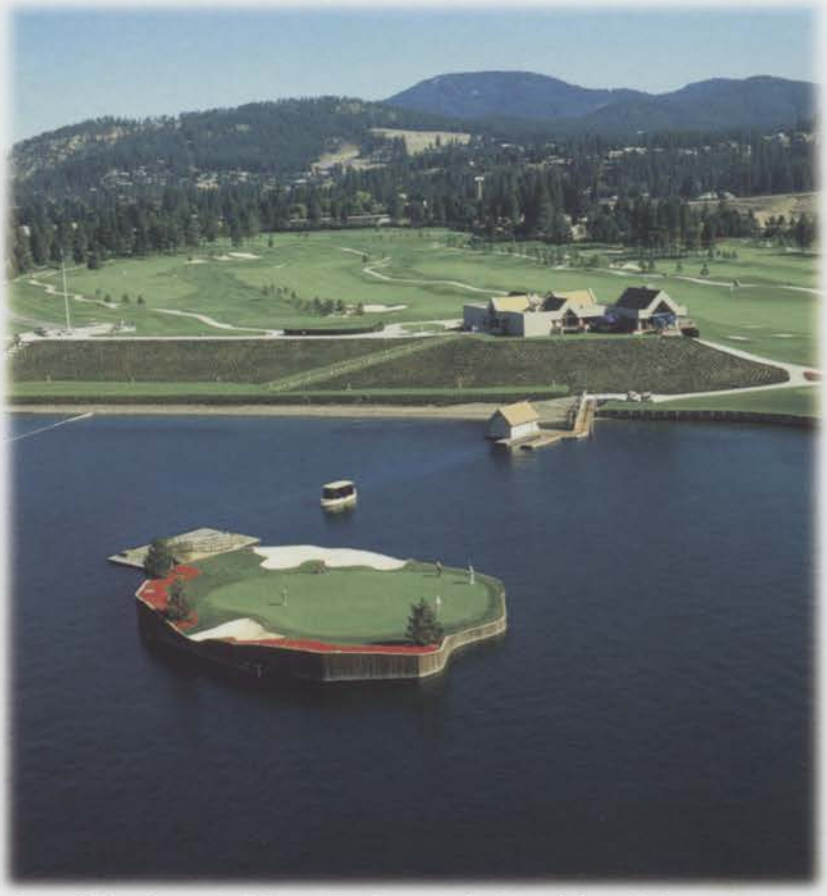

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cover

1st approach, The Grand Golf Club (photo by David Magahy – The Right Result) Image of Red Imported Fire Ant supplied by DPI Queensland

special features

research

in every edition

Editors Note

Congratulations to everyone who had surfaces up for footy finals and best of luck to those finishing renovations and getting ready for the hot weather.

In this edition of ATM, Blair Roots from the Queensland Department of Primary Industries outlines the threat that Red Imported Fire Ants (RIFA) pose to the outdoor activities that we take for granted. As I write this, the QDPI are throwing a $123 million eradication plan into action and if successful, it will be the first time ever that this menace has been defeated.

We also feature a profile on the reconstruction of the Carbrook Golf Club, which has quite literally 'risen from the deep' and this month in REVIEW, we investigate Plant Breeders Rights (PBR's). This is bound to become a hot topic and it is important that you know the rules. Also, this month in TECH TALK, Matthew Bywater provides a comprehensive review on pesticide mode of action.

Six years ago The Grand Golf Club in Queensland lay in ruin, but next month, the dreams of some Gold Coast visionaries and a dedicated staff come true when they play host to the 2001 Holden Australian Open. Golf Course Superintendent Rodney Cook tells us how they are preparing for the clubs most defining moment.

The cricket season is already here and in this edition, Keith McAuliffe from the NZ Sports Turf Institute evaluates the performance of contrasting cricket pitch constructions during the 1999/2000 New Zealand playing season. Also in RESEARCH, we publish work from Paolo Crose from the Italian Golf Federation who in conjunction with Dr. James Beard and other researchers assessed the relative competitive ability of thirteen varieties of *Agrostis stolonifera* to resist invasion from *Poa annua*.

In addition to this and more, we introduce the 18th Australian Turfgrass Conference and Trade Show that will be held in Brisbane next year and get in early to place your order for 'Sportsturf Protection – The Complete Guide To Turf Protection Products' that comes complete will MSDS sheets, colour ID charts and reference tables that allow you to search by active, trade name and pest controlled. Released in January 2002, this is a 'must have' for the professional turf manager.

Phil George

PHIL GEORGE
EDITOR

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President's Pen

Mark Couchman, AGCSA President

As I sit to write this report I think of the impact that world and local (Australia) events must have on the way that all those involved in the golf course industry throughout this great country of ours go about their business.

How will those events, and surely those that will follow, effect the way people go about the job, and even the possibility of how uncertain their future may become? I think that many golf operations will need to make adjustments to procedures in order to compensate for world trends and economic pressures that will be the resultant fall out from these events. One would like to think that we can all rise to the challenges that will confront us and hopefully we all will become far better people for the experience.

The AGCSA has over the past couple of months been reviewing operations, and hopefully, some of the changes will help to strengthen the Association's position and enable members to gain greater benefit from their membership.

The venue for next years Conference and Trade Show has been finalised and I am sure that Brisbane will turn on the winter warmth to make the event a great experience for all those who venture up to sunny Queensland. The most striking difference will surely be the ability for delegates to customise their registration to suit their own requirements from all aspects of the conference. Things such as the length of time people wish to stay, educational content, functions etc and by choosing the relevant options that they wish to take up can build their registration to fit within any budgetary impost that they may have.

Other developments at the AGCSA have been more related to the invisible tangibles that the Association offers to the members. Things such as the further development of relationships with other Associations like the PGA, AGU, state Golf Associations, Government Departments and the Golf Club Managers Association are just some of the work that is going on "behind the scenes".

I would just like to mention that once again the AGCSA will be providing Course Quality Officials at the Australian Golf Open and I would encourage all members and their respective staff's to seriously consider coming along and enjoying great golf up close.

Finally, just a quick note to wish all Golf Course Superintendents and all other Turf Managers, the best of luck over the coming months in the build up to any events that you may be holding or if its just going to be another "hot one".

Enjoy the Magazine.

Regards

Mark K. Couchman.

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FIRE ANT WAR — The Battle Lines are Drawn

February 22 this year was a black day for Queenslanders. It was the day a creature called *Solenopsis invicta* was discovered in Brisbane.

Solenopsis invicta is the scientific name for the Red Imported Fire Ant, a vicious and aggressive native of South America. By coincidence, the fire ants were discovered almost simultaneously in two different locations: one in the city's south-west suburbs the other near the mouth of the Brisbane River.

The red fire ant is an aggressive invader and once entrenched is a vigorous defender of its territory. When its mound-like nests are disturbed thousands of worker ants can swarm over the intruder, stinging repeatedly. The results aren't pretty: within hours unsightly pustules form on the skin of the victims, be they humans or other animals.

Red Imported Fire Ants were first identified in the United States, where they turned up in the port of Mobile, Alabama, in the 1930s. As far as anyone can tell they hitched a ride in soil used as ships' ballast. The ants have since spread across most of southern USA, and they're there for good: eradication is considered impossible.

We are not sure how the fire ants arrived in Brisbane. Movement across the docks in soil attached to shipping containers or equipment is suspected but we will probably never know for sure.

Fire ants pose a threat to public health, to our outdoor lifestyle, to the environment and to our biodiversity. The problem is not their size – they range from only 2mm to about 6mm but rather their aggressive nature.

Fire ants on your property can mean the end of the backyard barbecue. Where fire ants are present bare feet are not an option; the same goes for picnics in infested parks, or children's games in infested playgrounds. And we certainly don't want them on our golf courses.

Studies in Brisbane have already shown that entire layers of native wildlife have been eliminated from parts of Brisbane's bushland by the invading fire ants.

Fire ants can also be a serious pest of agriculture, eating seeds and damaging plants directly. A dense infestation of fire ant mounds can make it difficult or impossible to use agricultural machinery.

However, the problem is not simply that they sting. The American experience tells us that they can spread with alarming rapidity.

To begin with, fire ants disperse naturally through mating flights. The young queens and fertile males – both with wings – emerge in the spring and mate in the air, with the fertilised queens landing and burrowing into the ground to begin a new colony. A queen's mating flight will mostly end within one to two kilometres of the original nest, but they can travel much farther if assisted by wind.

Fire ants can move by other means as well. They have shown a readiness to move whole colonies if disturbed or if a site becomes unsuitable. In flood times masses of ants join together to form a raft and can travel on the current to countless new sites.

BY BLAIR ROOTS

But most frighteningly, fire ants are great hitchhikers. They just love to travel!

It was no accident that the march of the fire ant across the southern United States coincided with the housing boom following the Second World War. And this is where people in the turfgrass industries need to take notice.

We now know that the ants moved across the States in grass sod, ornamental plants and landscaping materials associated with the increased building activity. By 1953 the Americans had established a direct link between the spread of fire ants and the commercial nursery industry.

This simple fact alone is of great concern to Queensland's Department of Primary Industries, which has been given the job of fighting Brisbane's fire ants.

While Queensland's fire ants appear to be confined to the two epicentres, they have been detected at outlying sites – one at Cooroy, behind the Sunshine Coast, and one in Melbourne.

Both incidents were brought about by the movement of infested pot plants from a nursery in the heart of Brisbane's south-west. The DPI killed the ants at both outlying sites, and have traced plant movements both backwards and forwards from suspect nurseries. But the possibilities are sobering.

The situation in the United States is that eradicating Solenopsis invicta is simply not possible. Even though the ants arrived in the 1930s it was not until 1957 that Congress approved funds to fight them. By then it was too late. The exception may be California's Orange County, where a small infestation similar to Brisbane's has been detected.

The good news is that the Brisbane fire ants may be beatable.

One of the first things the DPI did was to import a group of fire ant experts from the United States to assess the Brisbane outbreak.

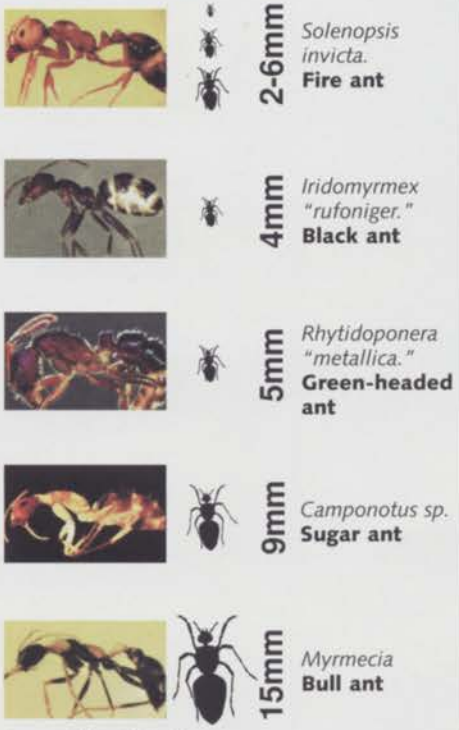
When they'd finished, the Americans – Professor Bart Drees and Dr Charles Barr from the Texas A&M University and Dr Sanford Porter from the US Department of Agriculture – gave us an 80% chance of beating the fire ant.

There was a caveat. There was no time to lose.

The DPI's first move was to help the public and business enterprises as and where needed.

There were examples where ants were causing immediate problems, such as stinging children and pets in suburban backyards. Ants turned up in pot plants in commercial nurseries, and in parks and school playgrounds. The department's Fire Ant Control Centre responded by eliminating these ants.

SIZE OF FIRE ANTS COMPARED WITH OTHER ANTS



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At the same time, Fire Ant Control began a scoping study to determine the feasability of an eradication program. It needed to understand the distribution and range of the ant, to control its spread, to look at the options for treating the pest – and finally, if it were possible, to develop a plan and a budget for eradication.

As a result of the study, the controllers are now as confident as they can be that the ants remain confined to the two epicentres around the port and the south-western suburbs.

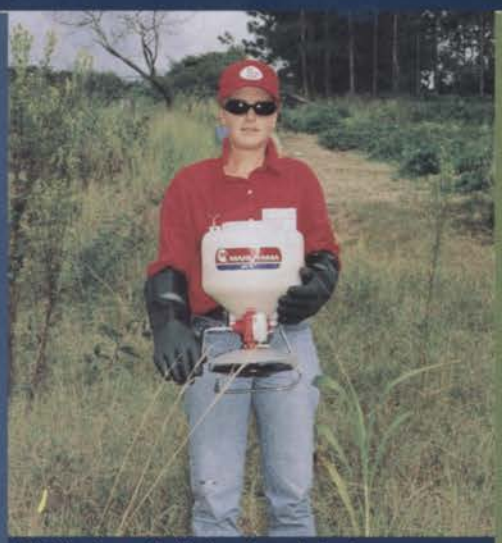
There was also a major publicity campaign on the theme Don't Spread Fire Ants!

This was based on the fire ants' precocious ability to travel in a range of media including soil, sand and gravel, mulch and hay and nursery products such as potted plants.

Fire Ant Control found itself working closely with soil, sand and gravel agents and the turf and nursery industries to try to control the spread of the ant.

But the main game was the total eradication of the fire ant – and for that the control team has to wait for spring.

The reason for this is that the ants enter a semi-dormant phase in cold weather. They begin to feed and forage far more widely as the weather warms up, and this has become the key to the eradication plan.



Distribution of baits is a key element of the erradication plan

The eradication campaign will involve the distribution of a low toxicity bait which the ants, in theory, will take back into the nests and feed to the queens, thus eliminating the colonies.

The bait consists of corn granules coated with soybean oil to attract the ants. Mixed with the soybean oil will be a combination of a metabolic growth inhibitor (hydramethylnon) and an insect growth regulator (S-methoprene). The active ingredients will make up only about 1% of the bait.

The combination will be used only for the first of twelve applications of the bait over three years. The remaining eleven treatments will involve the use of only the insect growth regulator, which acts as a sort of birth control by preventing the ants from reaching reproductive maturity.

The Fire Ant Control Centre has now embarked on a critical phase of the eradication campaign: securing the cooperation of the public.

The campaign will involve treating every backyard and commercial property within the infested zones with the corn granule baits. The reason for this total treatment is that fire ants can be present on a property without being visible. Their characteristic dome-shaped mounds may only become apparent after several months.

The DPI will therefore need the cooperation of the public in terms of entering properties to carry out the treatments. The public will also need to accept that the bait material will produce no ill effects in terms of human health.

In fact, the materials used in the baits are virtually harmless to people. The Fire Ant Control Centre's scientific staff calculate that a 100kg person would have to eat about 15kg of corn granules containing the hydramethylnon to have any chance of an ill effect; with S-methoprene, that person would have to consume about seven times their own body weight.

For quick and effective treatment of problem nests the teams are using chlorpyrifos, already widely used in the turf industry for lawn grub control. Chlorpyrifos is injected into the nests to exterminate the colony; it is mildly toxic to humans but is used in low concentrations and at the time of writing the Fire Ant Control Centre had used only about five litres in total.

The seriousness of the fire ant threat is illustrated by the fact that discussions on its control reached the level of ARMCANZ – the Agricultural and Resources Ministerial Council of Australia and New Zealand.

On the basis that the ant has the ability to infest all but the coldest areas of Australia and cover a possible area of 600,000 square km, our agriculture ministers have devoted a massive $123 millon to the project, to be shared equally between the Commonwealth and the States.

When, in three years time, the treatment phase is complete, the infested area will be monitored for fire ant activity. If no ants are found over two years, the eradication will be considered a success.

If that happens, it will be the first time anywhere in the world it has ever been done.

Blair Roots is the Media Officer with the Queensland Department of Primary Industries

Red Imported Fire Ants – Life Cycle and Habits

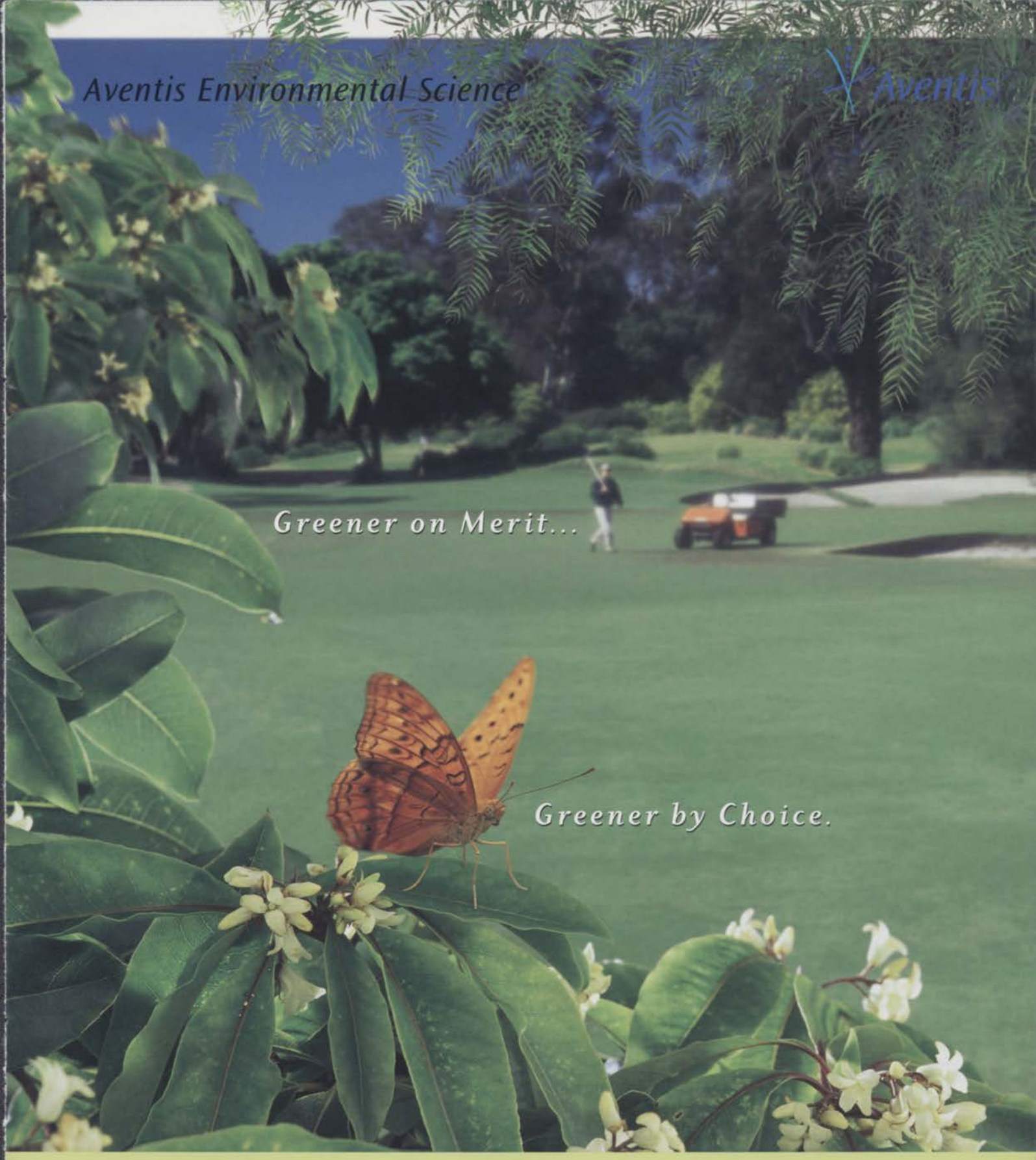
Established colonies produce new queens and winged males during warm spring and summer months. These winged reproductives swarm periodically, usually 5 to 9 times a year, often after a rain. Mated queens attempt to establish a new colony by digging a small hole in the soil and closing up the entrance. Inside this chamber, the queen lays 15 to 20 eggs in 2 to 3 days. More eggs are added over the next week by which time the first eggs hatch. The queen picks up the young larvae and sorts them into groups. The larvae are fed a liquid regurgitated by the queen.

After 20 to 25 days, the larvae pupate and tiny workers emerge 4 to 7 days later. These first workers are about 1/5 the size of the smallest workers found in an older colony. These workers break open the nesting chamber and begin foraging for insect food and start to enlarge the nest. The queen, now fed by workers, begins to lay more eggs, which are cared for by the workers. If food and water are adequate, the colony steadily grows over the next few months. If a colony is established in spring, it may contain 6,000 to 7,000 individuals by the autumn.

As the soil temperature drops, the colony growth slows. By the following spring, a one-year-old colony may have 10,000 to 15,000 workers and can be producing new winged forms. Colonies 2 to 3 years old may have 20,000 to 200,000 workers. Established mounds will have a central pile of granular soil with openings and often have smaller mounds around the perimeter.

From: Destructive Turf Insects (2nd edition) Harry D. Niemczyk Ph.D. and David J. Shetlar, Ph.D.

See review on page 51



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Leasing puts all clubs on an equal footing when it comes to their ability to operate the latest equipment whilst at the same time reserving available capital for use in upgrading the course layout, replacing or improving the club rooms or equipment sheds or undertaking some other necessary capital improvement to the club's infrastructure.

The move from the outright purchase of equipment in favour of leasing has taken some time for the turf and golf industries to embrace and as a result, there are few financiers specialising in providing leasing finance for these industries. Those organisations that have moved to leasing for their capital equipment have found that they needed to deal with different financiers for each piece of equipment, as there was no specialist financier addressing all the industries' needs.

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The principals of Wheelease have used their wealth of experience gained over many years in the motor vehicle leasing and fleet management industry to develop sophisticated and flexible leasing solutions to satisfy your capital equipment financing requirements.

We have also identified the need for clubs to have some certainty about the on-going operational cost of equipment they use and to that end, we are offering all of our leasing products with a fully maintained option. Our fully maintained option includes all scheduled and remedial maintenance (including the cost of labour and parts) other than that resulting from misuse or abuse of the equipment, and comprehensive insurance. The inclusion of maintenance and insurance into the leasing facility changes the cost of operating these assets from a variable cost to a fixed cost which in turn assists in cash flow planning and budgetary control.

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Insecticides in Turf - Mode of Action

The mode of action of a pesticide is "the means by which a pesticide exerts its toxic effect on an organism" (4). Synthetic insecticides exert their effect on the central nervous system (CNS) of the target insect, there are a multitude of sites on the CNS that an insecticide can act upon. In recent times, biological controls have been introduced to the turf market. and the mode-of-action of these varies with each organism used.

SYNTHETIC INSECTICIDES

When discussing the mode of action of a synthetic insecticide it is important to have an understanding of the intended target area (central nervous system) in order to be able to understand the various forms of insecticidal activity.

"Information flow through nervous systems depends upon moment-by-moment integration of excitatory and inhibitory signals that act upon the neuron's of given pathways"(5).

This information flow is a one way transport system where a message is sent via an electrical charge along the nervous system. Three types of neurons are classified by function: sensory neurons, motor neurons and interneurons. The interneurons connect the sensory and motor neurons (4).

Each neuron consists of axons that transmit the impulses. To transmit a signal from one axon to another, the signal must be sent across what is called the synaptic gap (or cleft). In order to do this a chemical signal is sent to a corresponding receptor on the post-synaptic side. Synthetic insecticides work in either the synaptic gap or along the axonic pathway.

SYNAPTIC POISONS

Most synthetic insecticides work in the synaptic gap. They achieve this by mimicking the nerve's chemical signals that are sent from the pre-synaptic nerve terminal. For every excitatory signal that is sent, a corresponding inhibitory signal is also sent. The signal chemical is de-activated by a specific enzyme.

The exact action of a synaptic poison then differs depending upon the chemical group.

Organophosphates

This group of insecticides work by inhibiting the enzyme cholinesterase in the synaptic gap. By a process called phosphorylation, the cholinesterase enzyme is bound to the insecticide molecule making it unavailable to inhibit the excitatory signal, acetylcholine, resulting in an over stimulation of the nervous system. This process is persistent with reactivation of the enzyme taking many hours or even days (2).

The excess of acetylcholine in the synaptic gap causes rapid twitching of voluntary muscles and finally paralysis.

eg. Chlorpyrifos, Diazinon, Fenamiphos, Trichlorfon

Carbamates

This group of insecticides also works by inhibiting the enzyme cholinesterase in the synaptic gap. By a process called carbamylation, the cholinesterase enzyme is bound to the insecticide molecule making it unavailable to inhibit the excitatory signal, acetylcholine, resulting in an over stimulation of the nervous system. Compared to phosphorylation, the carbamylated enzyme is relatively less stable, it will typically break down over a course of a few minutes (2).

As with organophosphates, the excess of acetylcholine in the synaptic gap causes rapid twitching of voluntary muscles and finally paralysis.

eg. Carbaryl, Bendiocarb

Chloronicotinyls

Similar to the Organophosphates and Carbamates this group of chemicals causes an over excitation of the nervous system by causing an excess of acetylcholine in the synaptic gap.

The major difference with a Chloronicotinyl is that the active ingredient will mimic the acetylcholine signal and block the post-synaptic receptor open. However as the Chloronicotinyl molecule is slightly different in structure it is not liable to be hydrolysed by the acetylcholine antagonist, cholinesterase. This allows a constant influx of sodium and calcium ions into the post-synaptic cell. This persistent activation leads to an over-stimulation resulting in hyper-excitation, convulsions, paralysis, and death of the insect.

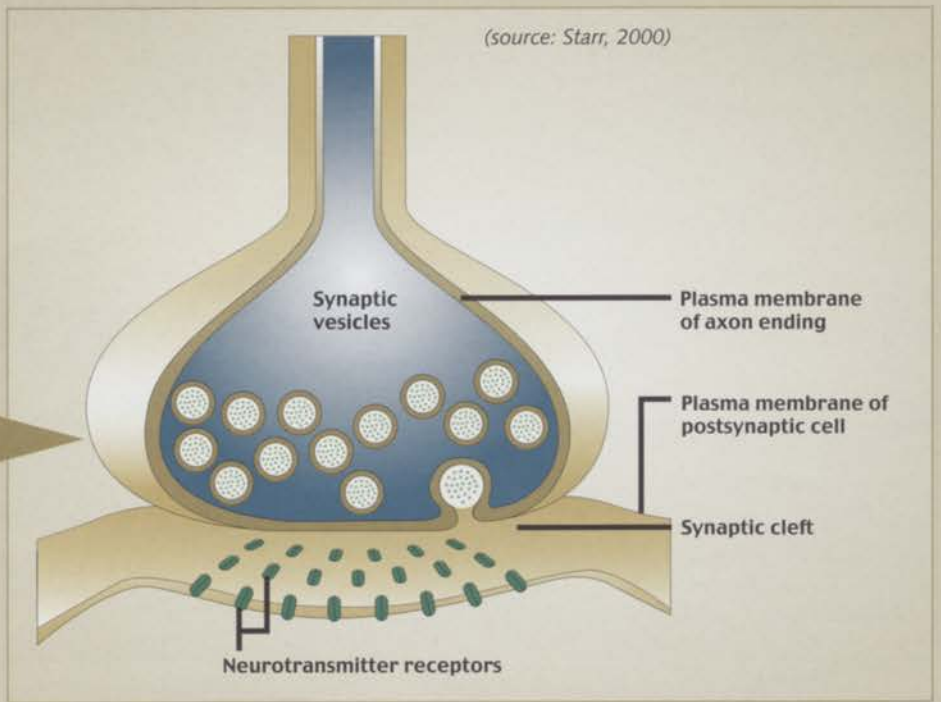
eg. Imidacloprid

Fiproles

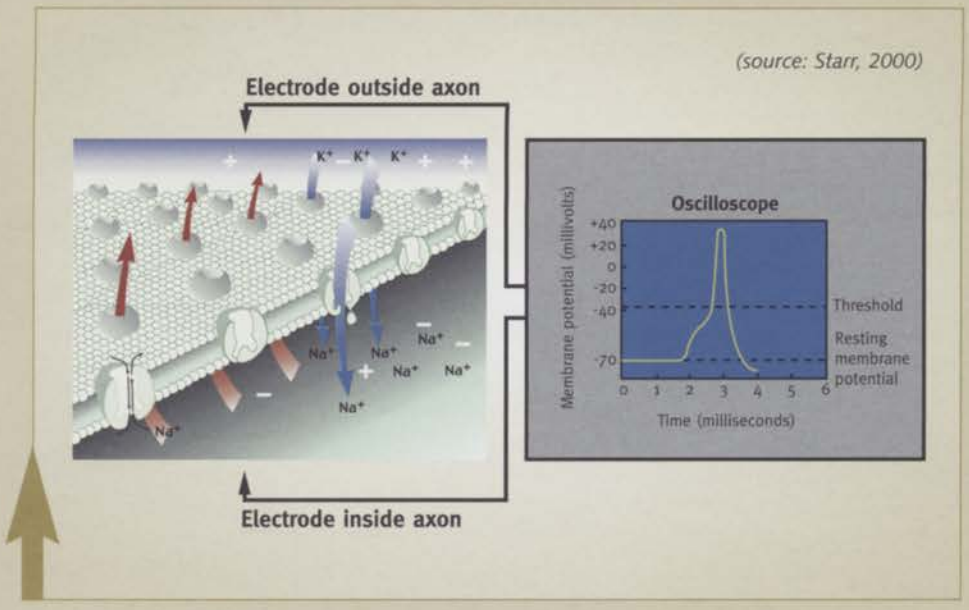
The Fiproles work by mimicking GABA (gamma-aminobutyric acid), an inhibitory signal sent from the pre-synaptic nerve terminal. They bind to the post-synaptic receptor for the GABA signal. When this receptor is "stuck" open it allows an influx of chloride ions into the post-synaptic neuron. This has a dampening effect on nerve impulses firing.

As the fiproles work on an inhibitory signal, the resultant effect is generally a lot slower and not as pronounced as that experienced with an organophosphate or synthetic pyrethroid insecticides.

eg. Fipronil



(source: Starr, 2000)



AXONIC POISONS

Messages are passed along axons via electrical impulses, this is achieved by altering the normal charge of the axon. Under resting conditions there is a large number of Na^+ ions on the outside of the axon and very few inside. Also, there are a large number of K^+ ions on the inside and very few outside. This results in a positive charge on the outside of the axon and a negative charge on the inside of the axon.

As a message is sent along the axon, a sodium channel is opened allowing increased amounts of sodium to enter inside the axon. At the same time a potassium channel is opened, allowing increased amounts of potassium on the outside of the axon. This has the effect of altering the charge of the axon on the outside to negative, and on the inside to positive.

Once the message has passed by, the sodium and potassium channels shut, restoring the outside of the axon to a positive charge and the inside to a negative charge.

Synthetic Pyrethroids

The synthetic pyrethroids are the only group of axonic poisons that are used in the turf industry. They exhibit their action by keeping the sodium channels along the axons open. This creates intense electrical activity that results in over excitation by the insect's nervous system.

This intense electrical activity results in a fast-acting response that is usually evident within minutes of the insect coming into contact with the insecticide.

eg. Bifenthrin, Cyfluthrin, Permethrin

BIOLOGICALS

Entomopathogenic Nematodes

Entomopathogenic nematodes (EN's) primarily belong to two genera, Steinernema, which has 18 species and *Heterorhabditis* having 8 species (1). Third stage larvae are the infectious stage, ranging in size from 0.5 mm to 1.5 mm in length. At this stage, the ENs can survive outside the host, as they do not require food. They have a closed mouth and anus and cannot feed until they find insect tissue. The EN is activated by insect movement and follows a carbon dioxide gradient to find the target pest. They enter the host through one of its natural openings (mouth, anus, and spiracles) where they gain entry into the blood cavity. (1)

The nematode larva then releases a highly specialised symbiotic bacteria *(Xenorhabdus* spp. in *Steinernema* and *Photorhabdus* spp. in *Heterorhabditis*) into the insect's body and toxins produced by these rapidly multiplying bacteria kill the insect within 48 hours (3). The bacteria then digest the insects body into material that the nematode can feed upon, while also producing antibiotics that preserve the dead insect, while the fourth stage nematodes develop into males and females that reproduce sexually. After mating the male dies and females lay eggs. The immature larvae remain inside the insect cadaver until reaching the 3rd stage, at which time they leave the dead insect to seek out a new host.

Bacillus thuringiensis subsp. kurstaki

Bacillus thuringiensis subsp. kurstaki is a fungus that produces protein walled fruiting bodies during sporulation, which carry insecticidal toxins. These bodies are ingested by the larvae of most insects within the order Lepidoptera. Once inside the insect the sporal proteins become solubilised and organisms within the insect's gut convert the original toxin into smaller toxins. These toxins then tightly bind to the insects gut cells at specific receptor binding sites. This disruption causes the formation of large pores that increase water permeability of the cell membrane resulting in large uptakes of water, causing swelling and eventual rupture of gut cells. This destroys the insect's gut lining preventing feeding. The insect dies several days later (3).

Metarhizium flavoviride

Metarhizium flavoviride is classed as an entomopathogen, whereby the fungus attacks the target insect by penetration of the cuticle and invasion of the fluids that bathes tissues

(source: Ecogrow Australia)

responsible for protein formation within the insect. This results in the insect becoming lethargic, and will eventually cease feeding. Death follows several days later. The fungus sporulates from the dead insect tissues outside the cadaver providing a source for continued infestation (3).

(1) Bedding, R. 2000. Nematodes and Their Use in Controlling Insect Pests in Turf. Proceedings of the Millennium Turfgrass Conference. Australian Golf Course Superintendents Association

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(5) Starr, C. 2000. Biology: concepts and applications 4th Edition. Brooks/Cole

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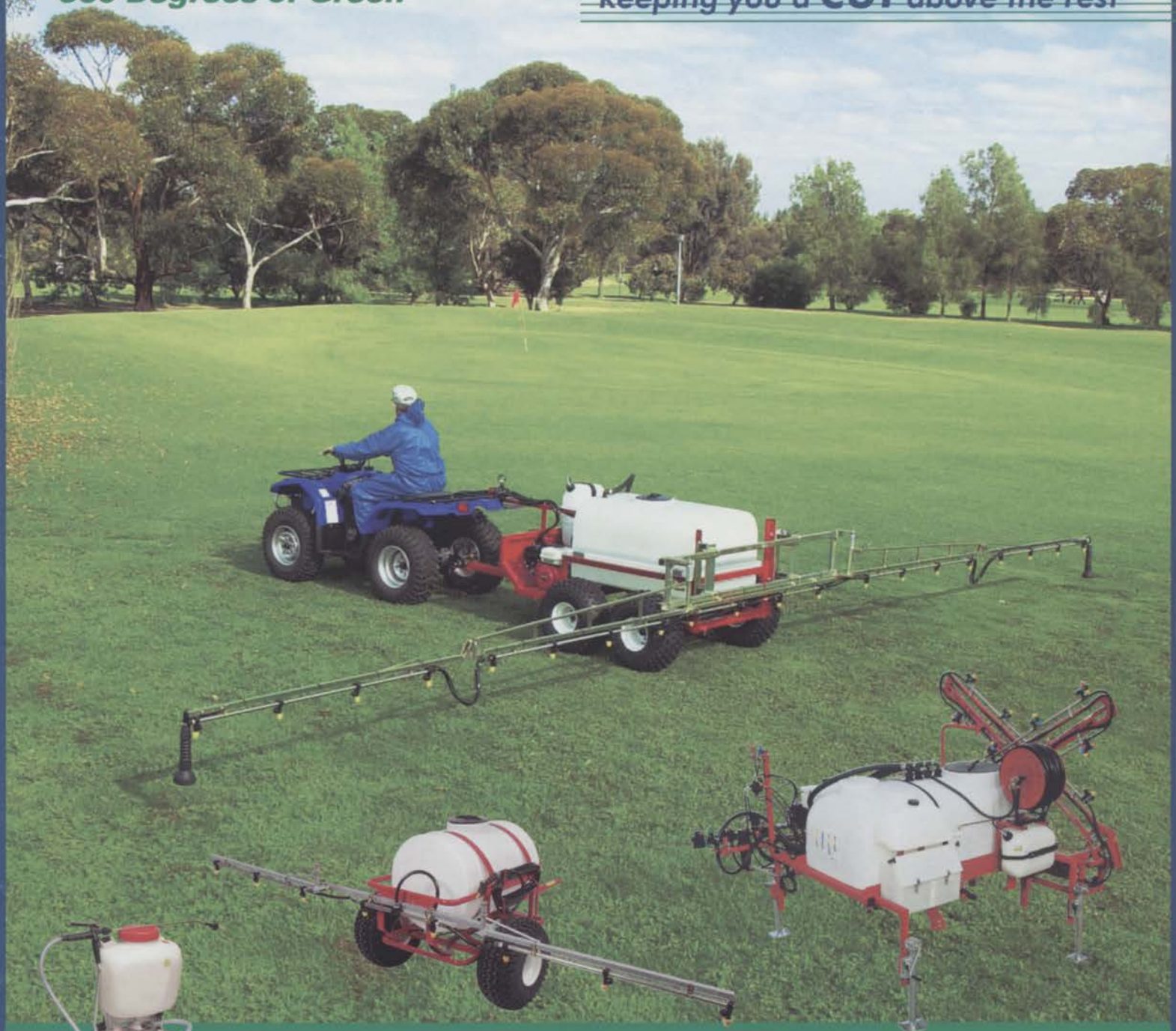

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John Deere Salute

Jeff Lane is the superintendent from Gosnells Golf Course in WA. He recently arranged to spend 5 weeks traveling and taking a peak at some of the world's famous golf courses. Amongst the courses he visited are the famed St Andrews, Sunningdale, Shinnicock Hills, The National, Pine Valley, Merion, and Cypress Point. While he was in the US, Jeff also had the opportunity to spend a week in Moline, Illinois observing the preparation for, and running of one of the PGA Tours newest tournaments, The John Deere Classic. This is Jeffs story.

"My week at TPC at Deere Run began with a welcome reception dinner at John Deere Headquarters on Sunday night along with all the other superintendents participating in the Pro-Am and John Deere Golf & Turf personnel. The next morning we had breakfast with guest speaker Jim Colbert from the Seniors Tour and then on to TPC at Deere Run for the inaugural John Deere Superintendent Pro-Am. What started out as just an opportunity to visit a PGA tournament was fast turning into one of the most exciting weeks of my trip.

The Superintendent Pro-Am is a new concept which brings together Superintendents and their respective managers or greens chairmans for a few days to participate in this great event. I was partnered for the event with two international guests, John Wells, Superintendent from Brocket Hall in London, and Junichi Hamada, owner of a John Deere distributorship in Japan.

Also making up our team was Chuck Greif, Worldwide Market Development and Intenational Sales Manager for John Deere Golf and Turf. Our professional was Tommy Tolles who was one of the nicest pros you could ever hope to meet.

The day turned out to be the hottest day I've ever played golf in, with temperatures around 38 C and the humidity around 250%. We made light work of the water bottles available at each tee. The caddies provided were from the local schools, and were a huge blessing. Our team had got to 5 under after the first five holes before the PGA's radar system detected some lightning somewhere and called us all in for an hour and a half. Still, once we got back onto the course we managed to hold it together to finish 16 under for the day - good enough for third place. We were presented with a framed golf memorabilia picture, and John Deere merchandise. The day finished with dinner and presentations.

The next day was another opportunity for us to play golf and raise thousands of dollars for local charities. A four ball ambrose event, at the Davenport Country Club turned out to be another great day. One of the more forgettable moments was on the hole where our best ball was lying between five or six big trees and we needed to all punch a low iron out and up the fairway. When my turn to hit came about, I chose to hit a 3-iron hard and low. Well I hit it hard and low but unfortunately straight out of the socket. It slammed into a tree 2 metres to the right and ricocheted straight back into my face before I had hardly even started my follow through. I luckily managed to escape unharmed, and although a little dazed, played the rest of the round reasonably well. Fortunately no one had caught that on film. These first two days which culminated with a paddle steamer cruise up the Mississippi were a real bonus to the week and typical of John Deere's wonderful hospitality and outstanding service and commitment to our industry.

The real reason I was in Moline was to be a part of the John Deere Classic tournament preparation. I woke up at 3.30am on Thursday morning ready for a 4am start at the maintenance facility of TPC at Deere Run.

Course Superintendent Pat Franklin was extremely friendly and allowed me to be involved in the days preparation for the John Deere Classic. At 4.30 am Toby and Scott, assistant superintendents, led a procession of about 20 John Deere Gators and 36 staff out into the darkness to prepare the first days play. On the next two mornings I had the opportunity to ride around with Scott and Toby and observe my first PGA major tournament preparation.

The staff operated two five-hour shifts during the tournament. In the morning, greens were double cut with handmowers and the dew removed from fairways, aprons and pathways. The pro tees were also handmowed and holes changed. Another part of the large workforce was required to hand rake the bunkers- a PGA requirement. The other part of that requirement was that all of the grooves left by the rakes point in the direction of the shot. The evening shift comprised of handmowing all of the greens, collars, aprons and other tees. Surrounds were cut with triplex mowers and then John Deere 3235's were used to mow the fairways. Rolling of greens was also carried out where required along with any handwatering. Green speeds were monitored daily to ensure uniformity of between 10 and 10.5 feet on all greens. Pat and his staff did an excellent job over the tournament. Preparing all these bent grass surfaces during such extreme weather conditions was an enormous task.

So what about the course itself? The land was bequeathed by a member of the John Deere family for public use. The golf course was then designed by PGA player, D.A. Weibring and is run entirely by the TPC. Along with all the other TPC venues in the US, the course is maintained exclusively by John Deere equipment, and the maintenance facility is a sight to behold. TPC at Deere Run is certainly a beautiful course. Its layout weaves through some picturesque hilly terrain making use of the natural landform, streams, trees and the Rock River. As I stated earlier, greens, tees, aprons and fairways were all bentgrass. Roughs were predominantly Kentucky blue grass. The course is a public facility that is able to cater for all levels of player. The course also fosters junior development with numerous junior tournaments and a greatly reduced junior green fee.

Overall, my week in the mid-west was the highlight of my tour, far exceeding my expectations and giving me the opportunity to satisfy my curiosity in taking part in the preparation of a PGA tournament. I can't thank the people of John Deere enough for their friendship, generosity and hospitality during the week. I would especially like to thank Chuck and all the staff at John Deere in the US for their kindness, as well as Pat, Scott, Toby, Dan and all the other staff at TPC at Deere Run, for making me feel so welcome and allowing me to be a part of their team for the week. "

Jeff with Tommy Tolles

JOHN DEERE

HAVE YOU BEEN READ YOUR RIGHTS?

PHIL GEORGE

Some would have you believe that growing grass is a case of 'just add water' but things are a little more complicated now and ignorance is poor defence.

Over the last few years there has been some confusion over which turf varieties a golf course or turf farm can propagate without breaching the Plant Breeders Rights Act 1994(PBR).

To conform with the 1991 revision of the International Convention for the Protection of New Varieties of Plants (the UPOV Convention), the Australian Parliament has passed new legislation, the *Plant Breeder's Rights Act 1994*, replacing the *Plant Variety Rights Act 1987*, which has been repealed.

Plant Breeder's Rights are exclusive commercial rights to a registered variety. The rights are a form of intellectual property, like patents and copyright, and are administered under the Act. In relation to propagating material of the registered variety, under the Act, without authorisation it is an infringement to;

- *commercially produce or reproduce the variety,*
- *condition the material for the purpose of propagation,*
- *offer the variety for sale,*
- *sell the variety,*
- *import or export the variety,*
- *stock the variety for the purposes described above,*
- *Use the name of the variety in relation to any other plant variety*

Exceptions to the breeder's right are the use of the variety privately and for non-commercial purposes, for experimental purposes, and for breeding other plant varieties. A variety can be used for these purposes irrespective of the existence of Plant Breeder's Rights.

Further details of the scope of the rights can be found in the Act. Copies of the Act and the Regulations are available from the web at: **www.austlii.edu.au.**

New turf varieties are being constantly developed for sporting, commercial and domestic applications. Quite often these new varieties will be protected by PBR, as such the turf grass industry as a whole has to be aware of the implications of breaches to the Act.

A golf course or turf farm purchasing a small quantity of a PBR protected variety for the purpose of trialing it to see if it is suitable for their particular area and application would not be infringing upon the rights of the PBR holder.

However, if the variety was then propagated into a larger area such as a fairway or turf field without the consent of the PBR holder, the Company, Association, Club or individual would be in breach of the Act.

To propagate a fairway, permission should be sought from the PBR holder. A fee or royalty may be payable which is generally calculated on the area to be covered.

In the case of a turf farm, the company would usually be required to apply for a grower's license, pay the required license fee and then pay the PBR holder a royalty based on the area sold over the life of the license.

The example below shows the implications for superintendents, clubs and course owners in relation to the PBR Act. For infringements of the Act, the penalty is up to $50,000 for an individual or up to $250,000 in the case of a Corporation.

"John Citizen is a Golf Course Superintendent at The Mars Golf Club and one spring he buys 1000m² of a registered variety of couch grass that he plants out onto half of one fairway. That summer, the couch grass spreads vigorously and by the end of the growing season the entire fairway is completely covered with the registered couch grass. The following spring the club decides to extend the practice fairway and instead of buying new turf, John suggests that they use couch stolons left over from renovations that they had just done to the fairway that contains the registered variety. They proceed with the plan and by the end of that summer an additional 5000m² is covered with the registered variety."

John Citizen infringed the Act if he didn't have authorisation to propagate the first half of the fairway. The Mars Golf Club also infringed the Act if they didn't have authorisation to propagate the practice fairway with the registered variety.

**Photo courtesy of Lillydale Turf Farm*


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THE COMPARATIVE COMPETITIVE ABILITY OF THIRTEEN AGROSTIS STOLONIFERA CULTIVARS TO POA ANNUA

13 replicated *Agrostis stolonifera* cultivars at the Torino Golf Club

Abstract

Poa annua has been an increasing problem on *Agrostis stolonifera* putting greens, especially with the lowering of the mowing height into the 2.5 to 3.8 mm range. Recently, a number of new *Agrostis stolonifera* cultivars have been released for use on putting greens. This investigation assesses the relative competitive ability of 13 *Agrostis stolonifera* cultivars under very closely mowed putting green cultural regime of 3.2 mm. The relative competitive ability is assessed by the transplanting of mature monostands of *Poa annua* into mature turfs of each of the 13 replicated *Agrostis stolonifera* cultivars. Four *Agrostis stolonifera* cultivars ranked superior in competitiveness with *Poa annua*, including Penn G2, Penn G6, Seaside II and Penn A1. Ranking lowest in aggressiveness under the very closely mowed conditions were Penncross and Pennlinks. Those *Agrostis stolonifera* cultivars sustaining shoot densities above 2000 dm^{-2} exhibited the most competitiveness in suppressing the *Poa annua* content in polystands. These findings suggest that significant cultural control of *Poa annua* can be accomplished on closely mowed putting greens by the selection of certain *Agrostis stolonifera* cultivars that can sustain very high shoot densities under close mowing condition.

J.B. BEARD, P. CROCE, M. MOCIONI, A. DE LUCA AND M. VOLTERRANI

Turf Managers inspect the site at a field day

Dr. James Beard with three of his assistants

INTRODUCTION

Agrostis stolonifera L. is used as a preferred turfgrass species on putting greens in Italy. It is uniquely adapted morphologically for use on putting greens (Beard, 1982). Extensive, prostate lateral stem development and high-shoot density have been sustained under frequent, close mowing of 4 to 6mm, depending on the cultivar. Recently the trend has been to lower cutting heights of 2.5 to 3.8 mm on putting greens.

Penncross has been the cultivar most widely accepted and used throughout the word for the past 35 years. Recently, a number of new *Agrostis stolonifera* cultivars have been released, with some that can sustain extraordinarily high shoot densities and very-low cutting heights of 2.5mm to 3.2mm (Croce *et al*.1998; Croce *et al*. 1994). Historically, *Poa annua* L. has been a significant problem on older putting greens. The objective of this investigation was to determine the comparative competitive ability of 13 *Agrostis* cultivars under a very-closely mowed putting green cultural regime.

MATERIALS AND METHODS

Establishment

Eight commercially available cultivars of *Agrostis stolonifera* were planted onto a 600 m^2 specially constructed experimental putting green located at the Torino Golf Club.

The plot size was 2.0m x 3.5m and they were arranged in a randomized block design with four replications. In addition, five genotypes that were an advanced experimental selection of *Agrostis stolonifera* from Pennsylvania State University were planted in an adjacent area at the same time. These plots were 2.0m x 1.75m in size, with two replications in a randomized block design. The root zone profile construction was a high-sand composition meeting USGA/Texas specifications, including a gravel drainage bed and subsurface drainage system.

The experimental area was planted on 4th May 1992. Preplant fertilisation consisted of nitrogen, phosphorus and potassium incorporated into the upper 100mm of the root zone at the rate of 1kg/100m^2. All cultivars were planted at the seeding rate of 0.5kg/100m^2, with the seed lightly raked into the surface. Vertical barrier boards were used to avoid contamination of seed between plots. No lateral movement occurred and successful turfgrass establishment was achieved with distinct perimeters between individual cultivar plots.

Cultural practices

During this study the cultural practices on the experimental putting green involved mowing six times per week in multiple directions at the 3.2mm cutting height using a triplex greensmower with the groomer attachment, and with clippings removed. The nitrogen fertilisation program consisted of 0.375 kg/100m^2 per growing month from March through October, totaling 3.0kg/100m^2 annually. The base phosphorus and potassium levels were applied as needed to maintain these nutrient levels in the 'high range' based on an annual chemical soil test. The pH of the root zone was 6.8.

Supplemental water was applied as needed to prevent visual wilt of the turf via gear-driven, pop-up heads arranged in the tight spacing that sustained uniform moisture conditions across the experimental area.

Topdressing was practiced at two-month intervals during the growing season at a rate of 0.16m^3/100m^2, using the same mix composition as the underlying root zone. No turf cultivation or vertical cutting was practiced on the turfed plots, to avoid interplot genotype contamination.

Disease and insect problems were minimal, except for dollar spot *(Sclerotinia homeocarpa* F.T. Bennett), which was allowed to develop with no fungicide applications made during 1993 growing season, in order to assess the relative cultivar susceptibility (Croce *et al.* 1993). A modest preventive fungicides program has been followed since 1995. No insecticides or herbicides have been applied. All emerging weeds were manually removed during the 1992 growing season. After the turfs had fully stabilized, weeds were allowed to develop across experimental area.

Treatments

A single 108mm diameter mature turf plug of *Poa annua* was transplanted into each replicate cultivar plot of the 13 *Agrostis stolonifera* cultivars. The same study and procedures were conducted in both 1998/1999 and 1999/2000. The plugs were transplanted on 23rd April 1998 (first study) and on 20th December 1999 (second study). The data presented will be for the first 1998-99 study, as the second 1999-2000 study simply confirmed the results of the first study.

Assessments

The inward *Agrostis stolonifera* shoot invasion or outward *Poa annua* shoot encroachment were measured at approximately 30 day intervals through the April to October growing season. The base reference used was a template of the 108mm diameter perimeter placed over the original *Poa annua* turf plug, which had a surface area of 91.5cm^2. Then two perpendicular diameters of the current perimeter were measured, a mean calculated, the corresponding surface area calculated, and the percent change in area compared to the original turf plug was calculated as a percent change.

Morphological assessments of the 13 cultivars of *Agrostis stolonifera* turfs were made in September 1995, 1997 and 2000. They consisted of actual shoot density counts conducted on a 1,600mm^2 area of turf.

All the data were summarized at the end of each growing season and processed for statistical assessment with the analyses of variance for the eight older cultivars being analyzed separately from that for the five new cultivars.

RESULTS AND DISCUSSION

Competitive Ability

The relative competitive abilities of thirteen *Agrostis stolonifera* cultivars against a monostand of *Poa annua* are shown in Table 1. Following the April 23, 1998 transplanting of the Poa annua turf monostand there is a small decline in diameter of the *Poa annua* plugs across all cultivars, except for Cobra. This is followed by an increase in the diameter of the *Poa annua* monostand for all eight of the older cultivars, and a decreasing trend in diameter of the *Poa annua* monostand in the case of the five newer cultivars. Between August 13 and September 30 of 1998 there was a trend to an increasing *Poa annua* diameter in six of the eight older cultivars, whereas in the case of the five newer cultivars there was a decreasing trend in the *Poa annua* monostand diameter for three of the five cultivars, with the exceptions being Penn G6 and Penn G1. During the 1999 growing season, there was a decreasing trend in the size of the *Poa annua* monostand for most *Agrostis stolonifera* cultivars. A distinct shift was noted to a polystand of *Poa annua* and *Agrostis*

Table 1. Comparative mean of percent Poa annua persisting in 108mm diameter turf plugs being invaded by each of thirteen Agrostis stolonifera cultivars

CULTIVARS	MEAN PERCENT POA ANNUA CONTENT												
	5/13/98	6/30/98	8/13/98	9/30/98	4/9/99	5/11/99	6/16/99	7/2/99	8/9/99	8/30/99		9/16/99	
Southshore	90.9	100.7	72.6	83.1	83.8	70.8	57.9	46.1	43.1	32.7	a*	20.1	a
SR 1020	87.5	97.3	78.8	94.6	90.7	76.2	63.7	49.4	42.0	39.3	ab	27.8	a
Putter	97.5	100.7	77.8	73.6	91.4	81.0	63.0	60.8	50.4	42.0	abc	30.5	a
Cobra	103.1	102.6	83.3	80.1	92.9	72.7	69.4	51.6	44.0	36.4	ab	33.5	a
Penneagle	94.0	101.6	82.0	86.0	88.2	73.7	67.1	57.2	41.1	29.2	a	36.0	ab
Providence	98.1	103.4	75.5	76.2	87.5	62.2	74.1	48.3	51.5	36.3	ab	37.3	b
Pennlinks	92.1	102.2	73.9	80.6	85.5	85.8	64.4	56.0	53.7	55.3	c	51.5	bc
Penncross	96.4	103.5	74.4	84.3	92.5	77.8	73.7	59.7	59.5	50.0	bc	58.4	c
LSD(P=0.05)	**5.76**	**10.92**	**15.16**	**17.50**	**12.55**	**12.07**	**15.50**	**7.22**	**5.12**	**13.78**		**17.16**	
Penn G2	93.7	75.5	53.3	46.6	32.2	30.9	36.4	19.4	17.6	8.7a		0.0	a
Penn G6	84.0	77.6	54.9	54.9	37.7	38.7	35.7	22.5	26.1	0.0	a	3.9	b
Seaside II	90.1	85.9	60.1	55.1	70.7	53.9	42.3	39.3	37.1	24.8	a	3.9	b
Penn A1	91.0	75.7	62.0	51.5	48.7	34.9	41.7	28.3	27.5	16.0	a	8.7	b
PennG1	94.6	77.5	51.7	60.5	51.7	50.9	36.9	27.1	24.9	11.8	a	23.6	b
LSD (P=0.05)	**19.53**	**35.52**	**19.67**	**24.57**	**22.00**	**26.11**	**15.18**	**10.33**	**23.57**	**25.54**		**23.18**	
Mean	**95.5**	**90.5**	**63.0**	**72.4**	**72.1**	**64.4**	**55.3**	**43.4**	**42.2**	**30.9**		**41.0**	

* Duncan's test (P=0.05)

stolonifera as the dominance of *Poa annua* decreased below 50% of the original transplanted diameter.

Four Agrostis stolonifera cultivars ranked superior in competitiveness with Poa annua. They were in order: Penn G2, Penn G6, Seaside II and Penn A1. Ranking the lowest in aggressiveness against Poa annua under very-close mowing conditions were Penncross and Pennlinks. This data indicates that it is possible to achieve significant cultural control over Poa annua via the development and use of high-density Agrostis stolonifera cultivars that can sustain high shoot densities under very closely mowed putting green conditions.

Table 2. Comparative shoot density counts of thirteen closely-mowed Agrostis stolonifera cultivars

SHOOT DENSITY (dm^{-2})						
CULTIVARS	1995		1997		2000		MEAN
Southshore	1692	a*	2037	a	1595	a	1775
Pennlinks	1553	ab	2186	a	1431	ab	1723
Providence	1395	b	2080	a	1494	ab	1656
Cobra	1363	b	1873	ab	1622	a	1619
SR 1020	1523	ab	1876	ab	1453	ab	1617
Putter	1356	b	1814	ab	1244	ab	1471
Penneagle	1383	b	1522	b	1398	ab	1434
Penncross	1358	b	1631	b	1119	b	1369
LSD value	214		376		342		
Penn G6	2700	a	3003	a	2199	a	2634
Penn A1	2325	a	2868	a	2175	a	2456
Penn G2	2366	a	2725	a	1941	a	2344
Penn G1	2228	a	2675	a	1772	a	2225
Seaside II	1475	b	2550	a	2241	a	2089
LSD value	538		1333		456		

* Duncan's test (P=0.05)

Shoot density

A high shoot density is usually preferred for putting greens as it results in a narrower leaf width and a more vertical leaf orientation that contribute to a more uniform surface for ball roll (Beard, 1982). A high shoot density also results in the turf being more competitive against weed, moss and algae invasion.
The comparative shoot densities of the 13 *Agrostis stolonifera* cultivars maintained under closely mowed putting green condition in a Mediterranean climate are shown in Table 2.

(*See next page*). Those *Agrostis stolonifera* cultivars that sustained shoot densities above 2000 dm^{-2} exhibited the most competitiveness in suppressing the *Poa annua* content in polystand maintained under very-closely mowed putting green conditions. Ranking the highest in shoot density were the newer cultivars – Penn G6, Penn A1, Penn G2, Penn G1 and Seaside II.

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By John Neylan

GREENS CONSTRUCTION

In my time in the turf industry (almost 20 years) and more so since being with the AGCSA, one of the most talked about topics has been greens construction.

Even at the International Turf Research Conference (ITRC), the topic was vigorously debated, particularly when it came to the laboratory methods for selecting the rootzone mix.

While we can nominate different methods of construction such as the USGA method, California method or sand profile construction, in essence we are usually discussing a high sand content rootzone mix that may be ameliorated with some form of amendment (eg. peat moss, poultry manure etc.). The variations that are employed include;

1. Sand selection (i.e. coarse through to fine sands)
2. Inclusion or absence of a gravel drainage blanket
3. Selection of rootzone amendments.

The combinations are numerous and I believe that this plays a large part in the apparent confusion and at times the lack of success of new constructions.

While we may use the terminology "USGA profile", or sand construction, do we really understand what we are dealing with? Do we understand the basic principles that govern the relationships between air and water movement within a rootzone?

There are well established criteria based on soil physics, on which to design a green and the United States Golf Association (USGA) provides us with the most comprehensive description of these criteria in their 1993 revision of the "Method for Greens Construction". The particle size distribution provides a starting point for selecting materials that are likely to meet the physical requirements of aeration, moisture retention and drainage. However, the critical factors on which to select the rootzone mix are the; volumetric water content, and aeration porosity (both at 30cm suction), and the hydraulic conductivity of a compacted sample. This information at the very least informs us as to whether a selected rootzone material fits within the acceptable criteria.

Planning, supervision and ongoing management is the key to success

McIntyre and Jakobsen have promoted the use of moisture release curves to determine the profile depth, so as to optimize the moisture retention and aeration characteristics as well as determining the hydraulic conductivity.

The key to selecting the rootzone material is to have it tested. Do not purchase "off the shelf" materials without testing first. The results must then be interpreted by an experienced turfgrass agronomist.

The inclusion of the gravel drainage blanket still remains a source of discussion and confusion. Should it be included or can it be left out? Again we need to ask ourselves what is its purpose? The gravel layer will form a perched water table (so therefore increases the water retention of the profile) and provides accelerated drainage. If it is eliminated, as with the California Method, will this be to the detriment of the final result? The short answer is no!

The crucial component that must be included is the pipe drainage. Sand greens will take in large amounts of water (rather than shed it) and any excess must have a means of removal.

Surface drainage appears to have been neglected by golf course designers in recent times. The recent construction of profiles with high drainage rates creates a false impression that surface drainage no longer needs to be considered. Depressions in the middle of greens, with no outlets, will accumulate excessive moisture compared to the surrounding areas and will suffer increased turf thinning and development of black layer.

People often ask why this happens and as with most turf problems it is a combination of factors that include;

1. The greater proportion of water that has to be removed.
2. The modification of infiltration rate due to the accumulation of thatch and,
3. Sealing of the surface in wet areas due to high moisture and traffic.

The ongoing maintenance of sand profiles can make or break what can otherwise be a good construction. The failure to understand the nutrient and moisture requirements of sand constructions has often resulted in the profile proclaimed as a failure. Thatch management is the absolute key to ensuring that the benefits of drainage and aeration are maintained. Dr. Richard Gibbs presented a paper at the ITRC that

demonstrated the influence of thatch accumulation and that the surface characteristics of a well-drained sand profile will be the same as a sandy loam profile if the thatch in not controlled.

To construct a green that meets the requirements of adequate drainage, aeration and moisture retention can be successfully achieved by understanding the basic principals of soil physics.

Site conditions and the availability of materials means that different methodologies can be used, providing they achieve the key criteria. Ultimately the overriding factor in determining success or failure is planning, supervision and ongoing management.

"DISEASE" OF THE MONTH

When examining turf problems, it is amazing how often we are confronted with the basic principles of turfgrass agronomy being at the root of the problem. Water, light, air and adequate nutrients are the corner stones to growing healthy turf.

As we observe the difficulties at Colonial Stadium it reinforces the importance of one of these elements – light. Over many years, it has been demonstrated that shade or low light intensities due to trees and building structures is detrimental to turf growth. It is not only difficult to grow and maintain turf under low light levels it is also very difficult to produce an acceptable surface.

Low light intensity is detrimental to turf growth

Light, in the presence of carbon dioxide and water is the catalyst for photosynthesis. Photosynthesis is the factory in which carbohydrates, the building blocks for plant growth, are produced. Turf that is shaded becomes etiolated, has poor wearability, is slow to recover from wear, develops algae and is susceptible to disease outbreaks. If the factory that produces the building blocks is functioning poorly, then the plant is less able to replace the damaged tissue. Plants that are growing vigorously will recover quicker from wear and can often outgrow the effects of wear and infections by fungal pathogens. During periods of low temperatures and naturally slow growth, the effects of shade are even more detrimental.

There are shade tolerant grasses such as the fine fescues, *Microlaena* sp. and *Poa supina* (and *Poa annua*). However, most of these species have very poor wear resistance under heavy traffic and low cutting heights. The new couchgrass cultivar "Plataeu" exhibits excellent shade tolerance and it may provide an option in some circumstances.

The reality is **"Shade is a major killer of sportsturf"** and it may require significant environmental modification or a turf replacement system to present a quality turf surface.

Turf replacement at Colonial Stadium

EPA NSW PROJECT

The AGCSA is presently working with the Cleaner Industries Unit of the EPA NSW to examine how golf courses can continue to improve their environmental stewardship. An industry focus group meeting was held in Sydney in May this year to canvass the key environmental issues affecting golf courses.

During this meeting several key areas were discussed including;

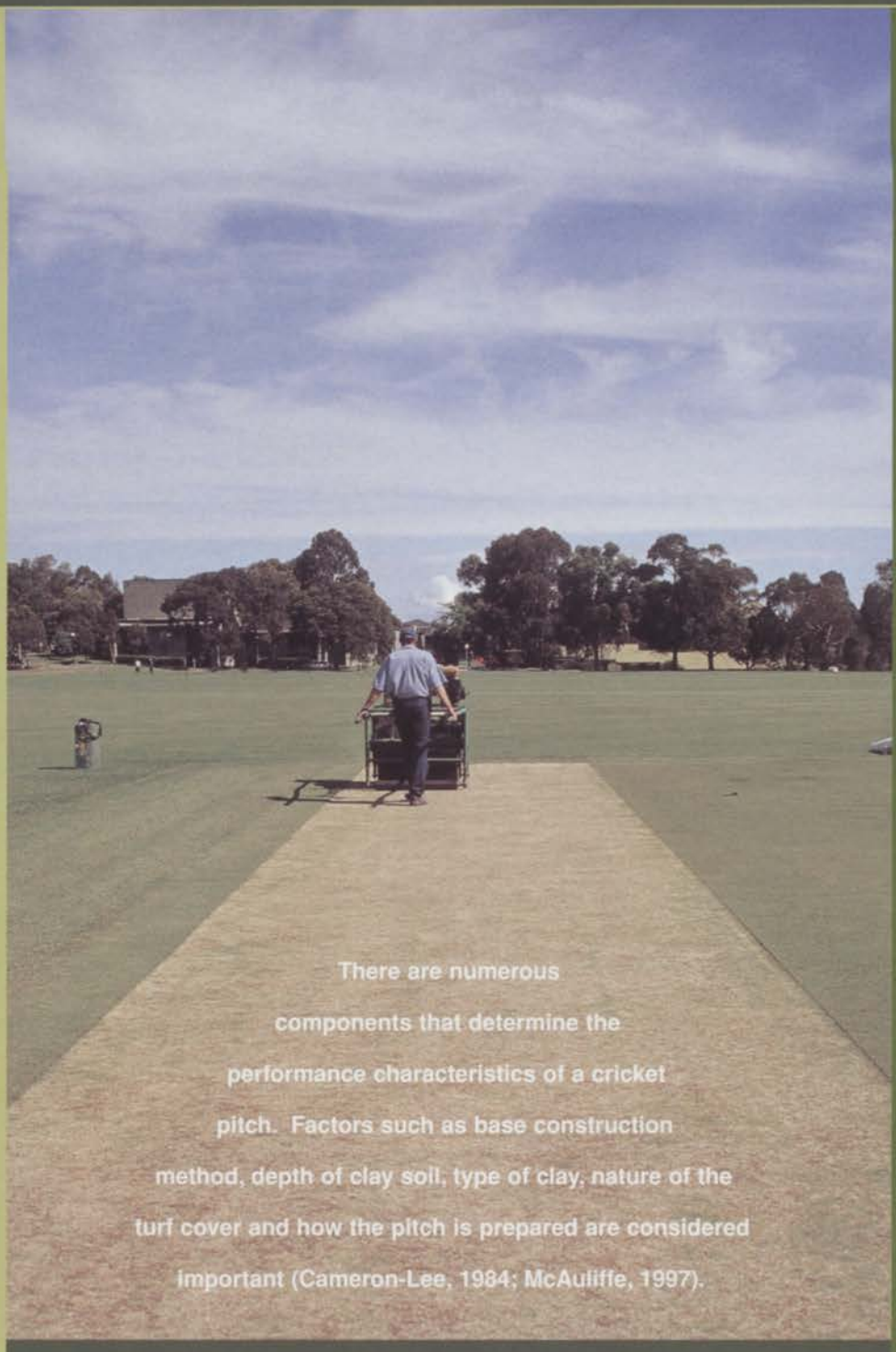
- Water / Irrigation management
- Impact of the new legislation affecting the use of pesticides
- Design, construction and maintenance of wash-down facilities

Several course inspections have been undertaken with the EPA officers to discuss on site, how environmental issues have been managed. These include; construction and earth works; vegetation management; wetland management and the construction of pesticide storage facilities and wash-down bays.

The outcome of the study will be to produce a manual and to undertake five (5) training workshops (likely to be in April 2002) around the State.

research

EFFECTS OF ROOT ZONE CONSTRUCTION AND PREPARATION METHODS ON CRICKET PITCH PERFORMANCE



There are numerous components that determine the performance characteristics of a cricket pitch. Factors such as base construction method, depth of clay soil, type of clay, nature of the turf cover and how the pitch is prepared are considered important (Cameron-Lee, 1984; McAuliffe, 1997).

ABSTRACT

The performance of contrasting cricket pitch constructions was evaluated during the 1999/2000 New Zealand playing season (October,1999 to March,2000).

There were consistent and significant differences between the performance of the four soils and the two depths of clay soil used. Deep (125 mm) clay soil over sand profiles consistently produced better ball rebound bounce than shallow (50 mm) clay soil over soil over sand profiles.

The use of a medium to heavy (4000) kg roller produced significantly higher ball rebound height and surface hardness than a light (1000 kg) roller.

Soil bulk density was invariably greater to 100mm depth when the heavier roller was used.

Removal of turf cover by a non-selective herbicide resulted in significantly lower ball rebound height than with well-grassed plots. That this difference could not be explained by moisture content variation alone warrants further investigation.

Data obtained using a 2.25 kg Clegg Hammer was more closely correlated with the ball rebound height measurements than were the readings from a 0.5 kg Clegg Hammer.

Several practical conclusions can be drawn from the research. Cricket pitches built using a greater depth of cricket clay soil tend to offer better performance than pitches built with only a shallow depth of clay soil. Heavy rolling is likely to give higher soil bulk densities, which in turn produces greater ball rebound height. Turf cover on a pitch increases ball rebound height, for reasons other than altering soil moisture content. The 2.25 kg Clegg Hammer has potential for use as a sensitive monitoring tool for assessing cricket pitch performance.

Several international groups have endeavoured to identify the key determinants of pitch performance. Pioneering work to scientifically evaluate cricket pitch performance was reported on by Stewart and Adams (1969).
Dury (1985) used a series of tests to gauge performance of U.K. pitches and to derive practical guidelines for pitch construction and preparation. He inferred that pitch pace is related to vertical ball rebound height.
Baker et al. (1988) reported on a study to assess the effects of soil type and depth on pitch performance. In 1995, a major project was initiated by the England and Wales Cricket Board to further the knowledge of cricket pitch performance. A part of this project involved collecting and analysing soil cores from first class pitches through the United Kingdom (Baker et. al. 1998a.). A second component throughout this project involved establishing a number of contrasting cricket pitch research plots at the Sports Turf Research Institute, Bingley (Baker et.al.,1998b.).

McIntyre (1983) analysed the characteristics of leading Australian wicket blocks in order to derive information about pitch construction and preparation methods. Also in Australia, Lush (1985) carried out research to analyse the potential of a Clegg Hammer for determining pitch performance.

New Zealand-based research on cricket pitches stems back to the 1980's. In 1985, a series of 32 plots were established by Massey University to evaluate a range of clay soil types and depths (McAuliffe and Tuohy, 1987). Cameron-Lee (1984) used these plots to derive information on factors affecting pitch performance. Murphy (1986) reported on work done by DSIR Grasslands to collect match day performance data from first class pitches around New Zealand. From this study a model for preparing pitches was derived (Murphy and Field, 1991). In the late 1980's Massey University carried out a trial to measure the rate and effect of moisture loss from trial plots (Kirkman et. al., 1989). Similar work was carried out by Walmsley (1997), involving monitoring of the changes that occurred in soil density and moisture content throughout preparation of selected first class venues.

This research culminated in the development of a model for pitch preparation (Walmsley et. al., 2001).

McAuliffe and Gibbs (1993) reported on testing procedure used by the NZ Sports Turf Institute to measure cricket pitch performance. The same two authors reported on the development of and results obtained from a machine built specifically to measure cricket pitch pace and bounce (McAuliffe and Gibbs, 1997).

Although much progress has been made towards understanding what factors determine the performance of a cricket pitch, there are still many unanswered questions that warrant investigation. It was with this in mind that a new research programme was initiated by the NZ Sports Turf Institute in 1998. The results from the second year of this programme are described in this paper.

MATERIALS AND METHODS

The experimental site was established in February, 1997 at the NZ Sports Turf Institute in Palmerston North, New Zealand and consisted of a series of non-replicated , 8m x 2m trial plots laid out in a grid pattern. Each plot was isolated by a surface water interceptor drain that connected with the underlying sand layer. Each plot was constructed with a different combination of clay soil type and depth. The four soil types evaluated included three commonly-used New Zealand cricket clay soils (the Marton, Waikari and Patamahoe soils) plus a local silt loam soil. Features of these soils are described by Norris (1992). Key properties of the soils are summarised as:

- Marton soil - non-swelling clay loam sub-soil; dominant minerals being mica, vermiculite and kandite; percentage clay:silt:sand of 46:47:7.
- Waikari soil - swelling clay loam sub-soil; dominant clay minerals being smectite and mica; percentage clay:silt:sand of 48:32:20.
- Patamahoe soil - limited swelling clay sub-soil; dominant minerals being kandite and hydroxy-Al interlayer vermiculite; percentage clay:silt:sand of 69:25:6.
- Local soil - non-swelling silt loam topsoil; percentage clay:silt:sand of 27:31:41.

Two contrasting depths of clay soil were used for the three recognised cricket clay soils; either 50mm of clay soil placed over 75mm of the local soil over a sand base, or 125 mm of clay soil placed directly over a sand base.

Plots were sown down in March 1997, using a blend of three commonly-used New Zealand-bred turf-type perennial ryegrasses (Lolium perenne L.) (Cultivars Divine, Assure and Saville). The same cultivars were used for the autumn 1999 renovation. All plots received similar management leading into the research programme. Management and pitch preparation methods followed recommended procedure for senior level cricket in New Zealand (Walmsley,1989). Key features of the management programme were:

- Renovation - four-way grooving, seeding and soiling done in autumn (April).
- Fertilizer - Application of compound fertiliser over autumn/early winter, with repeat dressing in spring (mid-August); two light dressings of nitrogen fertiliser (each 0.4 kg N per100 sq.m) during the cricket season .

Keith McAuliffe demonstrates aparatus used to measure pitch pace

- Irrigation - Water as needed, to ensure the complete clay soil profile is keep fully moist throughout the year, leading into the match preparation.
- Mowing - Lower cut from approx. 18mm over winter to 12mm during the cricket season. Progressively lower height of cut (down to 4 to 5mm) approaching match day.
- Rolling - Commence rolling within 24 hours of thoroughly soaking the profile and approximately twelve (12) days out from the match.

Plot preparation and maintenance for the 1999/2000 cricket season focussed on two hypothetical match dates, mid-December,1999 and mid-March, 2000. For the first monitoring period, each plot was split cross-wise to form sub-plots of 4m x2m in size. The two sub-plots for each main plot were then prepared with either a light (1000 kg) tandem roller, or a medium to heavy (4000 kg) tandem roller.

Approximately eight (8) hours of rolling was carried out over a three to four day period with each of the two rolling treatments.

For the second monitoring period (mid-March, 2000) each main plot was again split into two sub-plots, this time in a lengthwise direction, giving sub-plots of 8m x 1m dimensions. Sub-plot treatments were either bare grass cover, with the sward having been removed by a non-selective herbicide (Glyphosate) three months earlier, or well-grassed cover. The 4000 kg roller only was used during the second preparation, again for a total of approximately eight (8) hours.

Measurements on all sub-plots commenced on Day 1 of the hypothetical match and continued for a period of at least six days. The methods used to assess performance of the sub-plots were: Ball rebound height using a 3m drop height and a standard, new, 4-piece Kookaburra ball. A minimum of 10 readings per sub-plot per sampling date were taken by eye (to the bottom of the ball), with ball rebound height expressed as a percentage of the drop height.

Surface hardness was recorded using both a 0.5 kg and a 2.25 kg Clegg Impact Tester (Clegg, 1976).

Intact cores of 15 mm diameter by 25 mm in length were collected down to a 100 mm depth, in order to determine gravimetric moisture content and soil bulk density (Weaver, 1994). Sampling was done daily throughout the monitoring period.

Analyses sought to determine if there were significant differences between the:

- four soil types
- two contrasting clay soil depths
- two roller weights used to prepare the pitch
- verses grassed cover

RESULTS

Soil type

Results from both trials demonstrated that there were consistent performance differences between the four soils investigated. The Patamahoe and Marton soils were relatively similar and both produced significantly higher ball rebound height and surface hardness than the Waikari and local soils. Furthermore, there were differences in performance between the two monitoring periods, with the second match producing significantly higher bounce with the Patamahoe and local soils. Rebound height values obtained from the deep (125 mm) plots on Day 5 of both hypothetical matches are presented in Table 1.

Depth of clay soil

There were large and significant differences in rebound height between the deep (125 mm) and shallow (50 mm) clay soil depths for each of the clay soil types on all sampling dates for both hypothetical matches (Table 2). In all cases the deeper (125 mm) clay soil plots provided greater rebound height.

There was also invariably significantly higher 2.25 kg Clegg hammer readings recorded for the 125 mm clay soil depth plots than the 50 mm clay soil depth plots (results not shown).

Table 2: T-test comparisons of mean percentage ball rebound height for shallow clay soil depth (50mm) plots verses deep (125mm) clay soil plots on Days 1, 3 and 5 of both hypothetical matches for three cricket clay soil types. Values are for heavy roller and grassed sub-plots only.

CLAY SOIL TYPE AND DEPTH	MATCH 1 (DEC, 1999)			MATCH 2 (MAR,2000)		
	DAY1	DAY3	DAY5	DAY1	DAY3	DAY5
Patamahoe						
125mm	16	17	17	14	19	20
50mm	12*	13*	14*	9*	12*	16*
Marton						
125mm	19	19	19	16	22	21
50mm	12*	12*	12*	11*	12*	14*
Waikari						
125mm	11	10	11	10	12	11
50mm	7*	7*	8*	4*	6*	8*

* Difference in mean ball rebound height between shallow (50mm) and deep (125mm) clay soil profiles is significant (P=0.05)

Roller weight

All sub-plots prepared with the medium to heavy roller treatment produced greater rebound height and higher 2.25 kg Clegg Hammer readings than the corresponding light roller sub-plots. There was a constant trend over each soil depth for the soil bulk density to be greater when the heavier roller was used. Differences were significant for six of the twelve comparisons (results not shown).

Bare verses grass cover

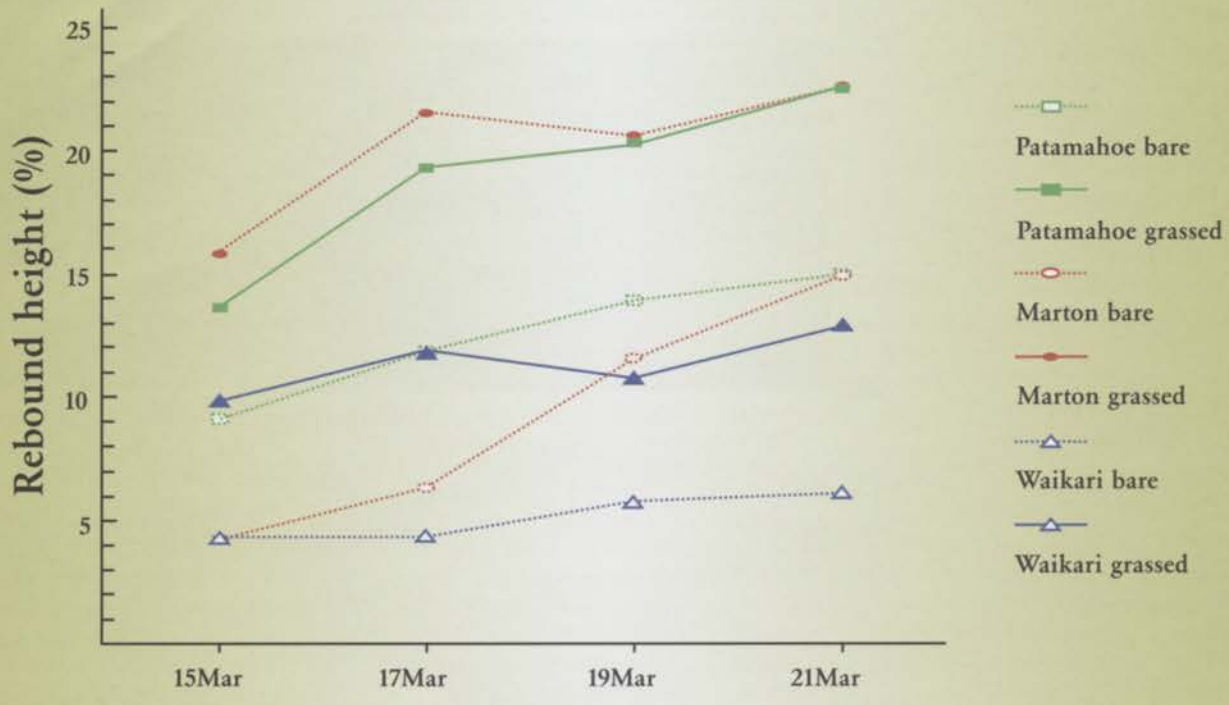
Large and significant differences were noted between the performance of the bare verses full-grassed sub-plots throughout the monitoring period. Although ball rebound height on the bare sub-plots increased over time, the bounce height for comparable grassed sub-plots always remained consistently higher (Fig. 1). Differences in rebound height between bare and grassed treatments were highly significant on all sampling dates for all soils.

Table 1: T-test comparisons of mean percentage ball rebound height and gravimetric moisture content (GMC)(values are the mean percentage in the 0-50mm and 50-100mm depths) on day 5 of both hypothetical matches. Values are for the deep soil profile plots, using only heavy roller and grassed sub-plots

SOIL TYPE	MATCH 1 (DEC, 1999)†		MATCH 2 (MAR,2000)†		MATCH COMPARISON‡
	BALL REBOUND HEIGHT (%)	GMC (%)	BALL REBOUND HEIGHT (%)	GMC (%)	
Patamahoe	17*	19/29	20*	24/26	*
Marton	19*	18/22	21*	15/17	NS
Waikari	11(NS)	24/31	11*	23/29	NS
Local soil	11	23/28	15	19/21	*

† Indicates whether there was a significant difference in mean percentage ball rebound height compared with the local soil.
‡ Indicates whether there was a significant difference in mean percentage ball rebound height for each soil between the two hypothetical matches

Fig1: Mean percentage ball rebound height for bare verses grassed plots recorded during the second hypothetical match (March, 2000).



Correlation of Clegg Hammer readings with ball rebound height

There was a very strong correlation (r = 0.87) between the 2.25 kg Clegg Hammer and ball rebound height (results not shown).
This contrasts with a correlation coefficient of r = 0.47 for the 0.5 kg Clegg Hammer and rebound height results.

DISCUSSION

Under the standard pitch preparation regime used on the plots, the full 125 mm clay soil depth consistently out-performed the 50 mm clay soil depth with regard to ball rebound height.
This result suggests that better bounce with any newly-constructed cricket block will be obtained by using a full (100mm plus) depth of cricket clay soil over a firm (e.g. stable sand) base, rather than using an intermediate layer of soil below the clay (which has been common practice in New Zealand for lower grade block construction).

That there were differences in performance between the four soil types evaluated is understandable, given that individual cricket clay soils are known to react quite differently in the field. Each cricket clay is known to have specific preparation requirements. The Patamahoe and Marton soils have so far produced the best results in this study. However, it is acknowledged that contrasting results could be obtained under a different preparation regime to that used.
This point is illustrated by the good results achieved over the 2000/2001 cricket season with the Waikari clay soil in the Canterbury region.

Results demonstrated that better compaction, hence improvement in ball rebound height was achieved using the heavier (4000 kg) roller. Turf managers throughout New Zealand have come to acknowledge the value of using a heavy roller to achieve good base soil density, particularly early in the season when the soil is sufficiently moist. Virtually all our First-class cricket venues are now using a heavy (greater than 4000kg) roller at some stage of their pitch preparation.

Results from the second hypothetical match demonstrated the value of having live turf grass cover in a cricket pitch. That the bare sub-plots provided significantly lower ball rebound height than the well-grassed sub-plots for all soils and on all sampling dates was unexpected. Furthermore the differences between rebound height on bare verses grassed sub-plots could not be explained by moisture content variation alone, since there were only very small differences in gravimetric moisture content between the two treatments during the early stages of sampling (e.g. a difference of only 1% w/w throughout the profile on Day 1).
It is hypothesised that the better bounce obtained with turf cover is, to a large degree, due to the plant root and stem systems improving soil tensile strength, such that sub-soil deformation upon ball contact with the soil is reduced.

Results demonstrated the potential of the 2.25 kg Clegg Hammer as a tool to accurately reflect the rebound characteristics of a pitch. In contrast, the poorer correlation found between the 0.5 kg Clegg Hammer readings and rebound height suggests that this weight of Hammer is of limited value as a tool for pitch evaluation.

From the data sets collected over the 1999/2000 season, it is considered that first class pitches in New Zealand should be able to achieve a match-day 2.25 kg Clegg Hammer reading of at least 20 CIV units (200 gravities).

CONCLUSIONS

Trials reported in this paper highlight several key determinants of cricket pitch performance. Each of the four soils used offered contrasting results, with the performance of each soil depending on the pitch preparation programme.

Deep (125 mm clay soil over sand) plots provided consistently better ball rebound height than shallow (50 mm clay soil over soil over sand) plots.

A 4000 kg roller produced greater ball rebound height on all plots than a 1000 kg roller.

Removal of the sward using a non-selective herbicide three months prior to monitoring resulted in lower ball rebound height than with grass present. This may suggest that the roots and stems of the turf provided better soil stability, which limits soil deformation (and energy loss) upon ball impact.

There was a very close correlation between 2.25 kg Clegg Hammer readings and ball rebound height, and this suggests that the 2.25 kg Clegg hammer has potential for use as a tool for evaluating cricket pitch performance. In contrast the 0.5 kg Clegg Hammer readings were only weakly correlated with rebound bounce.

* *Please note, a full reference list can be obtained by contacting the editor: philgeorge@agcsa.com.au*

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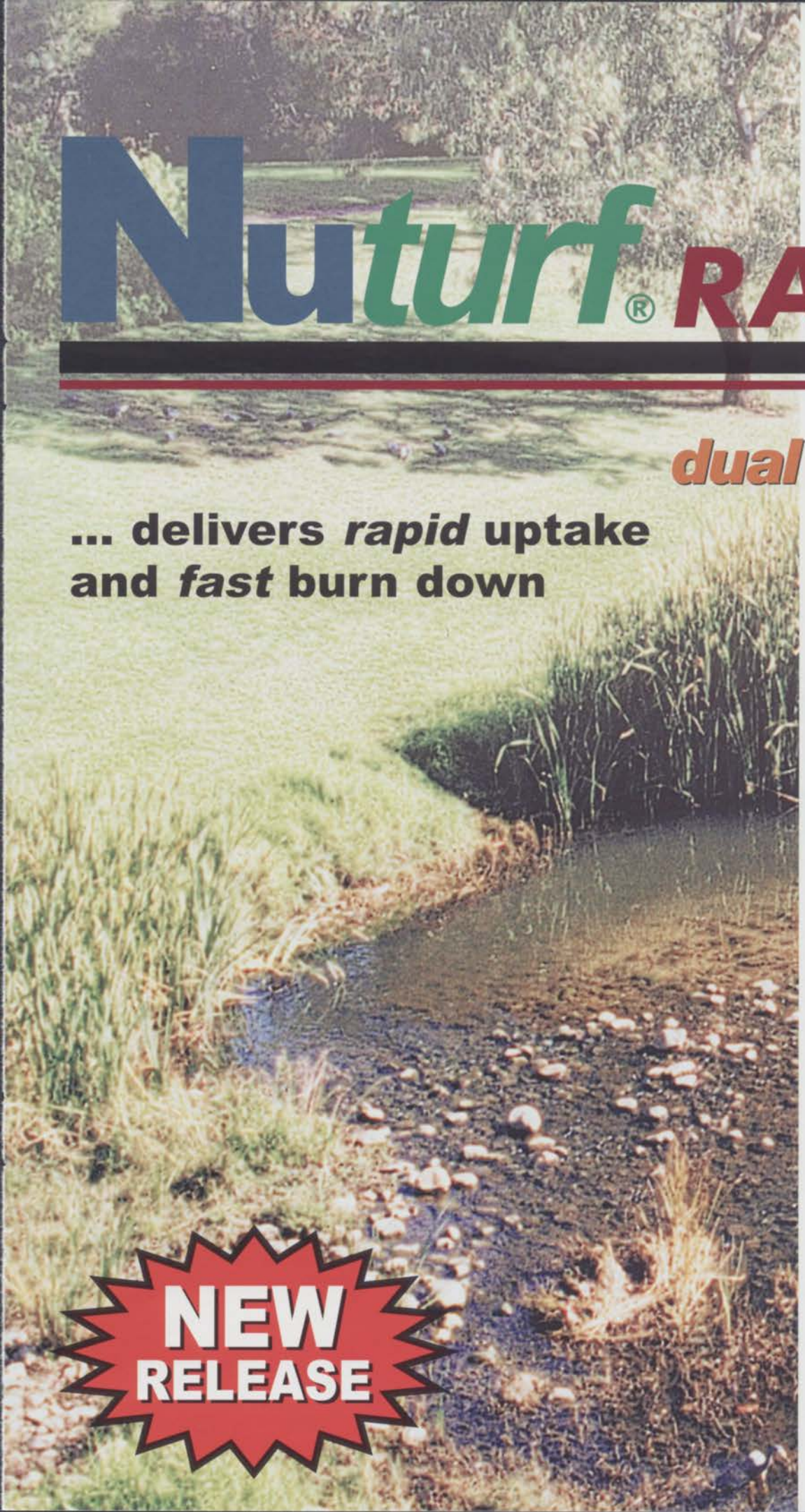

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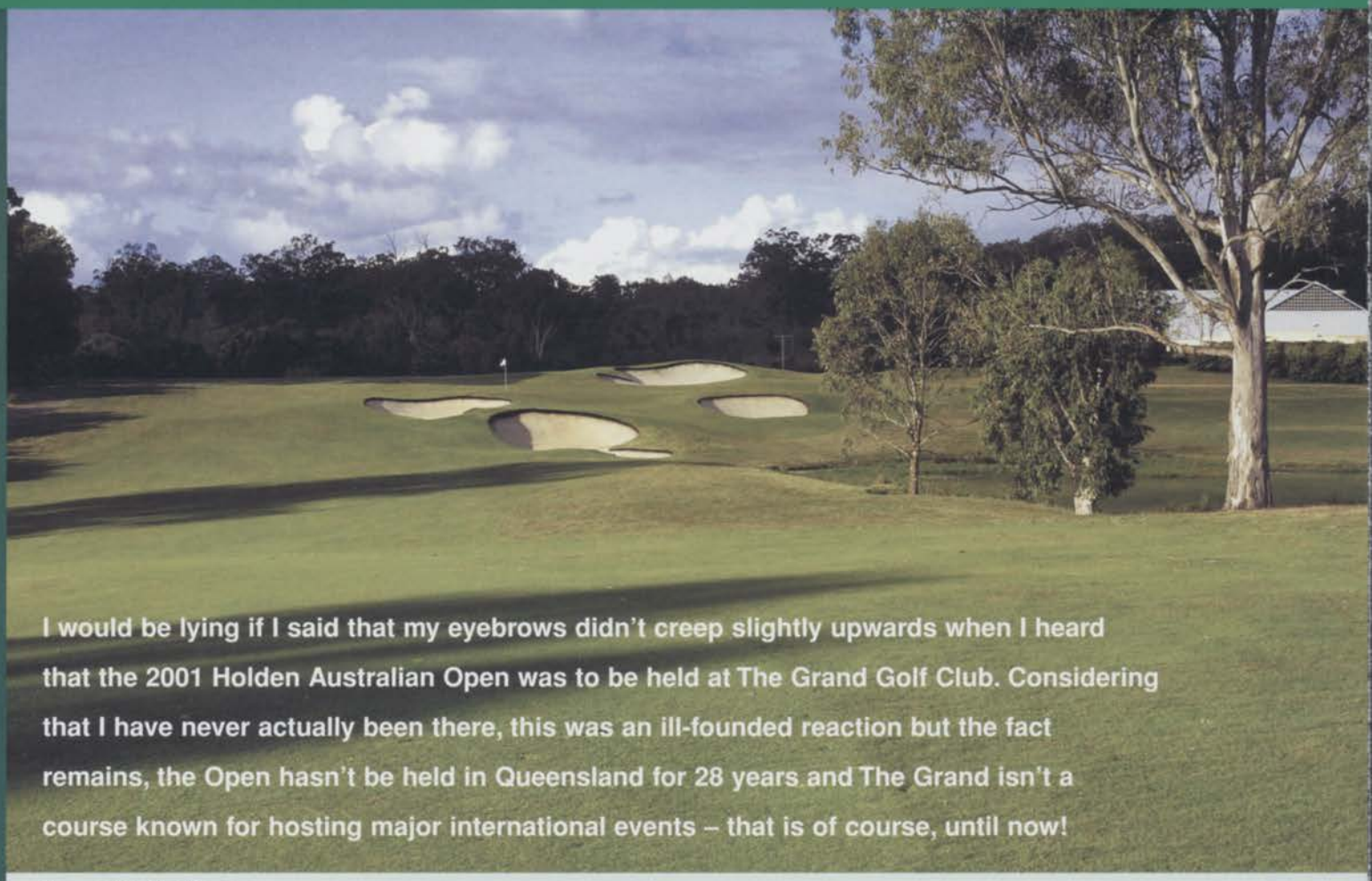


I would be lying if I said that my eyebrows didn't creep slightly upwards when I heard that the 2001 Holden Australian Open was to be held at The Grand Golf Club. Considering that I have never actually been there, this was an ill-founded reaction but the fact remains, the Open hasn't be held in Queensland for 28 years and The Grand isn't a course known for hosting major international events – that is of course, until now!

Approach to the 18th Green

Located in the Gold Coast 'Hinterland' just 20 minutes west of Surfers Paradise, The Grand Golf Club (known originally as the Gilston Golf Club) is a 6,200m championship layout that was designed and constructed by Greg Norman during the peak of 1980's hedonism. Incredibly, the Japanese owners of the course were forced to close the gates just two days after the 'grand' opening and there it sat for six long years until the property was purchased by a group of local Gold Coast businessmen who had a dream of restoring the course to its former glory.

In 1996, the new owners commissioned David Burrup (David Burrup Golf Course and Sporturf Design) to project manage the courses resurrection which began by redefining the course using slashers and industrial mowers and spaying out the massive weed infestations. Soon after, Greg Norman, his designer Bob Harrison and well know course shaper, Vince Fleming and Darby Mueller were brought back 'to breath new life into the place' and ended up reshaping all greens, bunkers and tees and many of the fairways were 'touched up'.

Already familiar with him from his days as a teacher at Grovely TAFE, David Burrup employed former student Rodney Cook as Construction Superintendent and together they worked to ensure that the course was reopened for members just 18 months later in the December of 1997. It was also at TAFE where Rod come across Ross Edwards who Rod credits with leading a wave of change that swept across turf management in Queensland.

Before taking up the challenge at The Grand, Rod spent a total of eight years at the Mcleod Golf Club (four as GCS) and spent a couple of years at Indooroopilly as the Assistant to Neil Surman. Rod lists David and Ross among his greatest influences so it is a stroke of luck touched with irony that Ross will be working along side Rod as a member of his casual team in this years Open preparation.

Rod describes his management style as "simple" and believes that success comes from doing the basic things well. He sticks to management practices that he knows are effective and although he does experiment, his loyalties run deep. The golf course is surrounded on three sides by the Nerang River and has a creek that winds its way through the course so Rod is particularly prudent with his use of chemicals and fertilisers. Water entering and exiting the course is tested at least every six months and soil nutrient testing done through AGCSATech is performed regularly.

News that the Australian Open would be held at The Grand was delivered in July last year. Understandably, Rodney, his staff and the entire club was absolutely thrilled and wasted no time in knuckling down to the job at hand.

Soon after the July announcement, Colin Philips from the Australian Golf Union (AGU) together with Greg Norman and Bob Harrison visited the course to fine tune details such as fairway alignment and recommended the construction of new tees at the 5th, 12th, 14th, 16th and 18th to lengthen and refine holes where needed. These changes together with the construction of a new practice tee on a dairy farm adjacent to the 14th hole and the addition of an extra 150m² to the putting green was

completed by the end of October last year.

The club also brought forward plans to upgrade the system of creeks that runs through the course and undertook a massive project to remove the established noxious weeds and replace them with species such as Lamandra, Leptospermum and Beckia. A bridge connecting the 7th green and 8th tee was upgraded and a number of picturesque weirs such as those near the 11th and 12th greens were constructed. The work was funded by a group of committed and generous members and although it was completed just two months ago, it has blended in beautifully with the rest of the course.

As is generally the case these days with the preparation of Open courses, the AGU requires the rough to have "teeth". Aware of the difficulties that Martin Greenwood had in producing four inches of rough at Kingston Heath last year (see ATM Volume 2.5 "The Heath"), Rodney started on the roughs early and has been fertilising, watering (traveling irrigator), aerating and cutting the rough at 100mm for over twelve months. However, looking at the roughs today you wouldn't know it because they have been battered by recent dry weather, frost and cart traffic. Rod is hoping that some warmer weather will bring them back in time for the tournament. In addition to this, fairways, tees and greens surrounds were verti-drained, heavily dethatched and then topdressed in September last year.

This year, renovations were done in September and although the treatment was less severe, fairways, tees and greens surrounds were verti-drained, scarified then topdressed and the 328 greens that are routinely dusted every four weeks were scarified with verticutting reels attached to the Jacobsen Greenskings and verti-drained to a depth of 100mm using 8mm tynes.

Native couch fairways were then fertilised with 'quick release' (22:2.2:8.3) product at 200kg / ha and a custom blend dynamic lifter (10:3:8) at 320kg / ha. A slow release product will go out in October and provided recovery from renovations is strong, this product is likely to have a high analysis of potassium.

The common couch, Santa ana and Wintergreen tees, 328 green and the greens surrounds were fertilised with 15:2.1:6.6 at 1.67kg/100m^2 in the middle of September then again two weeks later with 18:3:18 at 2kg/100m^2.

These areas will be fed on a 'needs basis' from now until the tournament, which begins on November 22nd, with a 10:1:10 liquid product.

A wetting agent was applied to all turf surfaces at renovation and the greens will now be treated every three to four weeks. Towards the end of October, greens will be treated with Imidacloprid (Merit) to guard against Black Beetle (Heteronychus arator), Trinexapac Ethyl (Primo) will be applied at 2mls /100m^2 to 'tighten up' greens, surrounds and fairways and monthly applications of fungicides will guard against a range of fungal pathogens halosulfuronmethyl (Sempra) is also applied to control Mulumbimby Couch.

Left: Every green on the golf course was reconstructed during the course redevelopment
Right: The predominantly Jacobsen machinery will be working at full capacity in the lead up to the tournament

Until the greens have recovered fully from the September renovations, they will be maintained at a cutting height of 3.75mm using Jacobsen walk behinds that have been fitted with brushes to help the turf 'stand up' for cutting. This is a tip that Rod picked up from Martin Greenwood whilst in Melbourne observing the preparation of Kingston Heath for last years Open.

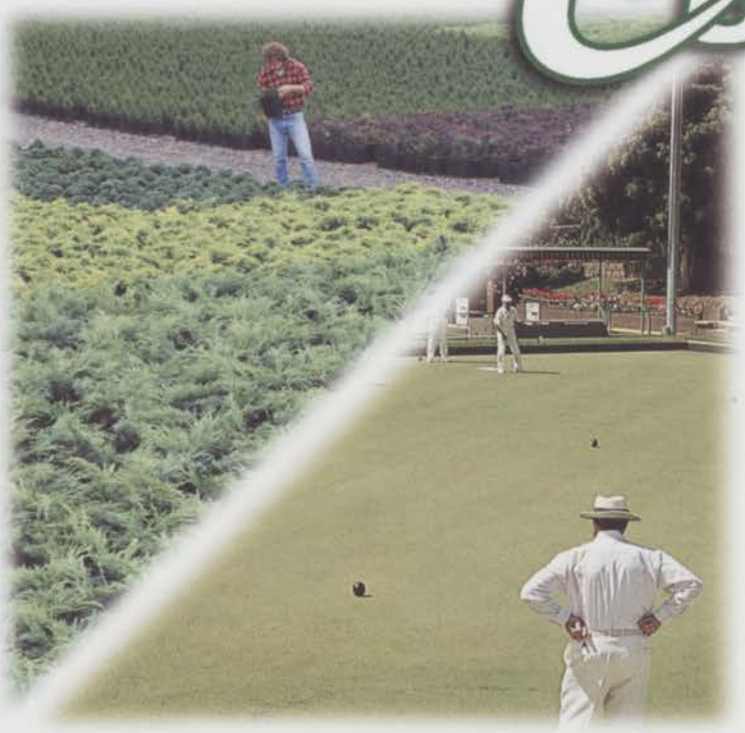
At the end of October Rod will begin to bring down the height of cut to his tournament target height of 2.5 – 3mm. Rod hopes to have the greens rolling 10-11m from the stimp meter and said that they would be rolled in preparation for tournament play but also stated that green speed will be limited by some quite severe slopes that exist on at least four or five greens. The fairways are maintained at a height of 10mm and once growth begins to peak they will be double cut every second day.

Ensuring that the turf is in its best possible condition is only half the job done. In the lead up to the tournament, Rod and his staff have the added complication of accommodating for massive upgrades to electrical, water and telephone services, stringent OH & S requirements and will be busy managing the erection of numerous grand stands and will work closely with Channel 7 to ensure that television coverage is first class.

When in 1996 David Burrup and Rodney Cook pushed open the gates that guarded what was then a 'jungle' complete with weeds that were six feet high and trees growing out of tees, greens and bunkers, the mere thought of hosting an Australian Open just six years later could have been nothing more than a dream. That dream is about to come true.

When I interviewed Rod he commented that the assistance that he had received from some of the industries most experienced Superintendents was "priceless" and he made special mention of John Odell, Martin Greenwood, Kelly Highland, Frank Paul, Martin Black and Doug Robinson.

Rod also mentioned that the outpouring of best wishes, support and genorous offers of machinery and staff from superintendents right across Queensland and Northern NSW was astonishing and also paid tribute to his assistant Cameron Crepin and the rest of his dedicated staff.



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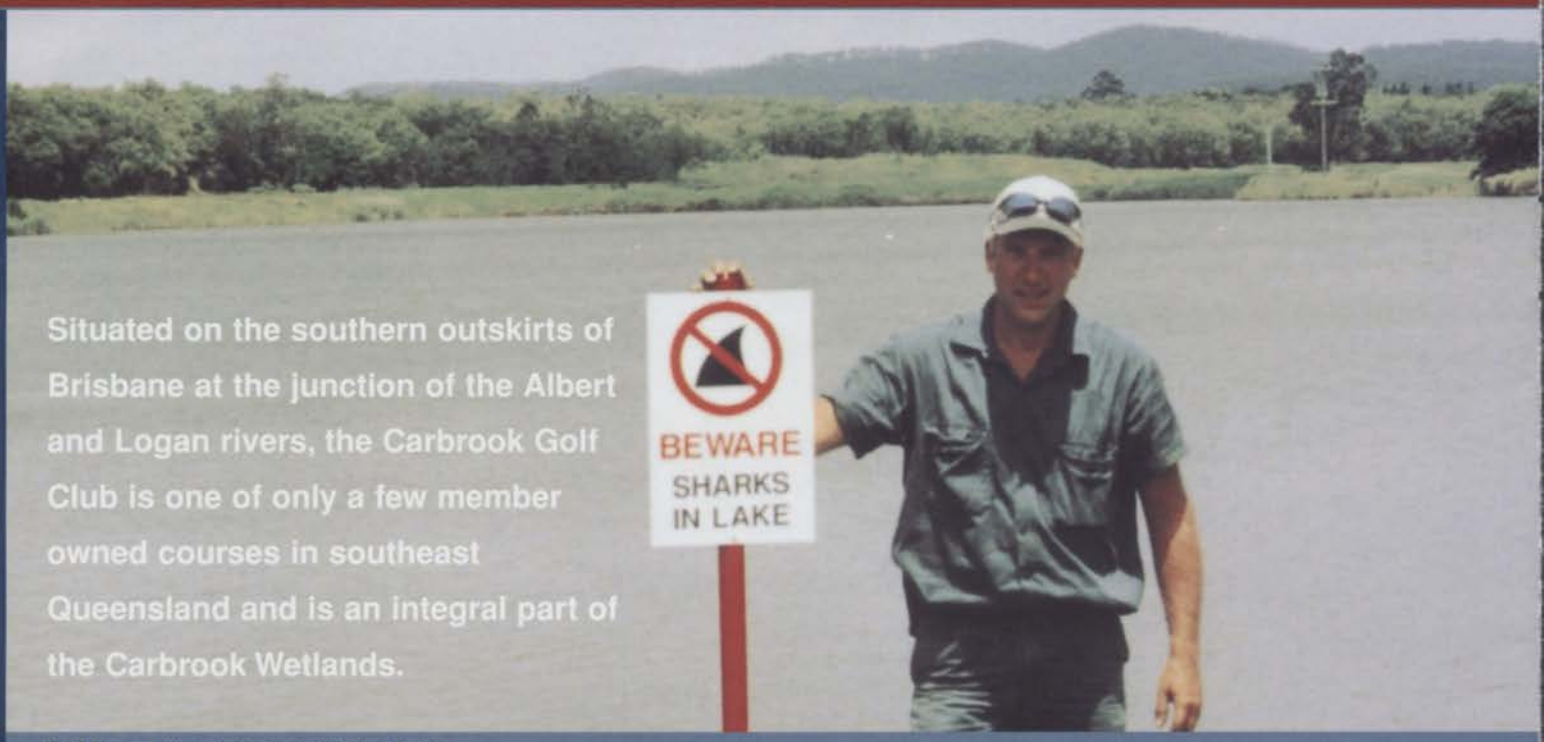
CARBROOK GOLF CLUB - RISING FROM THE DEEP



Situated on the southern outskirts of Brisbane at the junction of the Albert and Logan rivers, the Carbrook Golf Club is one of only a few member owned courses in southeast Queensland and is an integral part of the Carbrook Wetlands.

Golf Course Superintendent - Martyn Hedley

Prior to the construction of the original course in 1977 the site contained large stands of timber most of which was cleared for cattle grazing which resulted in damage to the wetlands. Around this time large sand deposits were discovered beneath the course and a lease was granted to a local mining company to extract this sand which, resulted in a progressive realignment of the course layout.

In 1992 the members purchased the property and a year later a decision was made to commence a complete reconstruction of the 18-hole layout in several stages. Objectives of the construction were to produce a quality golf course with full irrigation and USGA specified greens, partially relocate to an adjoining parcel of land allowing sand extraction to continue, utilise the overburden from the mining operation, lifting the course out of flood levels and distance the course from the gradual erosion of the banks of the Logan River.

It was decided to carry out the course design, construction and irrigation installation completely in-house, using the expertise within the club. However, a number of problems needed to be addressed first. Since all existing lakes and creeks on the course were saline and town water was not available, obtaining a fresh water supply was essential for the project to succeed. The construction of a new housing estate 6km away, along with a waste-water treatment plant appeared to be the solution, the club generously offering to dispose of the water.

An extensive environmental impact study was conducted, including flora and fauna surveys, resulting in a comprehensive environmental plan. Restoration and enhancement of the local ecosystem was a key feature of the plan and this aspect in particular was warmly received by members. Construction commenced in 1993 and was carried out in a series of stages that involved constructing, relocating and commissioning three to four holes a year allowing the old holes to be stripped for sand extraction.

I joined the club in 1995 as 2IC and at this time only four holes had been completed and were in play. Six months later I became Course Superintendent and although daunted by the huge task of completing the reconstruction, the realisation of why Nathan Smith (2IC) and myself had to relocate the course hit home with a vengeance.

Over a ten-day period we received 900mm of rain causing both the Logan and Albert Rivers to burst their banks resulting in severe flooding. Due to the poor drainage of the old course, flood waters took several weeks to recede leaving a layer of silt that in some places, was over one metre deep! Fortunately, the four new holes drained perfectly and were ready for play within days of the flood waters subsiding.

As for the old course all greens and tees required hosing and hand 'squeegeeing' to remove the thick silt layer. Fairways and roughs were cleaned up using bobcats with hastily made squeegee attachments. This was effective but definitely not a desired option as we were left with many wheel ruts across the course. Thinner layers of silt were allowed to dry and crack and were then broken up and rubbed in with a heavy tractor mounted lawn level. Despite the delay to construction and financial losses to the club, our desire to relocate had been reinforced.

Once flood damage had been repaired it was back into construction of holes four and seven. Bulk earthworks were carried out by life member, Ken Dyer and his son Jason using 22 tonne excavators. The pair stripped off the over-burden for sand extraction and once

900mm was received in a ten day period, bursting the banks of the Logan and Albot Rivers

dumped on site contoured the soil for us to take over. In all over 800 000 cubic metres was used to raise and construct the final layout.

The soil is basically a 'river mud' and this posed huge problems when installing irrigation, particularly the pipe work. Open trenches left for only a few days would either close up or crack and cave in and much hand digging was required. We eventually became experts at recovering bogged vehicles.

However, the major concern was that it was 'Potentially Acid Sulphate Soil' (PASS). Issues with our acid sulphate soils are ongoing but with a pH of 4 in places, a strict liming programme is required.

An electric/hydraulic Toro CDS system was chosen to minimise the wiring required in the corrosive acidic conditions after much power harrowing and levelling, fairways were stolonised, occasionally by hand with either Green Lees Park or Wintergreen. Greens were constructed by compacting the dry fill to form the base and were the built to USGA specifications and stolonised with Tif Dwarf.

We eventually became experts at recovering bogged vehicles

With the club still facing financial difficulties the whole project was carried out with the smallest of budgets, minimal equipment (one bobcat, three tractors and a few implements), a ground staff of five, myself included, the occasional casual and a mechanic kept busy with continual break downs. The staff treated this project with enthusiasm and put in a fantastic effort. Every day was like a 'backyard blitz'!

In 1998 I was fortunate enough to win the Environmental Greenkeeping Award for Qld and was a national finalist in the AGCSA Claude Crockford Environmental Award for the work we had done on the new course.

In 1995 the Carbrook area listed as a Wetlands of National Importance and moves are now under way to declare the area under national heritage. In keeping with this status an extensive wetland and lake system was created, involving the construction of a weir and flood gate system, converting a large tidal salt water lake into fresh water, now frequented by approximately 40 species of water birds, many migratory. A total of 112 bird species can be found on the course.

Groundstaff constructing weir

Small pockets of wilderness were left that were linked by planting corridors of endemic casuarinas, melaleucas and eucalypts, over one thousand so far, whilst dead trees (snags) were left where possible to provide wildlife habitat.

The lakes and creeks are alive with fish, such as mangrove jack, bream, mullet, tarpon, herring and gar. With the largest of the ex-sand mining lakes, over 90 acres in area and up to 18 metres deep in places there have been several sightings of sharks. These are bull or estuarine whaler sharks, up to two metres in length and have been known to get a bit agro, particularly towards pelicans. It is most likely these sharks entered the lake during floods and thrive on the plentiful fish life.

Other environmental initiatives include the establishment of monitoring stations for ground water, lakes and soil. Lakes were stocked with mosquito eating gudgeon and gambusae, native grasses were planted and bird boxes have been erected. Phragmites around lake edges act as filters and nutrient strippers. Relatively high threshold levels for pests and diseases are tolerated reducing chemical use and consequently, there are now signs of the re-emergence of many animal species, such as wallabies and bandicoots.

Involvement from Government and community group's has been encouraged by opening the site to universities and schools for wetland field trips, bird watching groups and animal release programs.

Over the course of nine years (and a flood), seventeen complete holes and forty-seven bunkers have been constructed with minimal disruption to play. In February this year the final layout was complete, leaving only the 12th still requiring reconstruction. As each new stage opened there has been a noticeable rise in the number of players coming through the course realising that the new Carbrook was a vast improvement on the old 'goat track'.

For me the most rewarding aspects of this whole project have been overcoming the constant challenges, observing the return of wild life and working with a truly great crew, all of who worked above and beyond the call of duty. This has been a project we are all very proud of.

The greatest reward would now be to gain Audubon accreditation.

Martyn Hedley is the Course Superintendent at the Carbrook Golf Club

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news

Simplot Backs Australian Turf Traders

Hot on the heals of the acquisition of Turfcare Supplies Victoria, J. R. Simplot Australia (Turf & Horticulture) have announced the formation of a strategic alliance with a number of state based distributors to ensure that their clients have access to the best possible products at the best possible price with the same level of individual service.

"I have always done business one-on-one and have made some great friends along the way, so it seemed a natural progression to ask all my BEST fertiliser distributors to discuss the possibility of forming a buying / marketing alliance where all of their skills and contacts could be brought together for one common good", said John Matheson Manager of the Asia Pacific turf business.

Rob Kenna, Sales Manger for Turfcare Supplies Victoria set up a meeting on the 10th of September where representatives from companies such as T-Link in S.A., Northern Rivers Rural Buying in Qld, Turfcare NSW and Turfcare Supplies Victoria thrashed out the formation of a buying and marketing alliance.

By the end of the day Australian Turf Traders (ATT) had been formed and a group of enthusiastic individuals had become an enthusiastic group dedicated to ensuring their customers had access to the best available range of turfcare products.

Rob Kenna said that now more than ever there was a need to protect and encourage state based distributors of turf products and felt that the market would respond accordingly. Rob said, "all of our customers will benefit from this and at the end of the that is what our job is all about".

Any companies interested in negociating product or service distribution through A.T.T. should contact Rob Kenna at Turfcare Supplies Victoria on 03 9587 4993.

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Royal Pines is one of the top ten courses in Australia, but its newest distinction is that of having the first color GPS system in Australia. "The installation at Royal Pines is a tremendous testament to the overwhelming benefits that the ProLink GPS System can bring to a golf course," said Doug Lecker, ProLink's President and CEO.

ProLink GPS Systems offer tremendous value to golfers worldwide. They provide a unique and memorable experience through: (1) a computerized layout of each hole, (2) "Pro Tips" on how to play each hole strategically and aggressively, (3) exact yardage from anywhere on a hole to the pin, (4) a green layout to see the contours of the putting surface and (5) a golf ball icon that can be moved to any spot on a hole for yardage to various hazards for layups and other strategic shots. In addition, ProLink offers a host of customizable options, such as an on-board menu which allows golfers to order food from their cart and a tournament scoring package which allows golfers to keep their score on the screen with just the touch of a button.

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Dr. Earl Elsner, Georgia Seed Development Corporation, "Ultra fine hybrid couchrasses"

Dr. Richard Gibbs, New Zealand SportsTurf Institute, "Renovation and its effect on rootgrowth"

Dr. David Huff, Penn. State University, "Breeding poa annua for greens"

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18th Turfgrass

9TH International Turfgrass Research Conference

Well known turf identities at the 2001 ITRC

I was please to be able to attend the 9th International Turf Research Conference (ITRC), in Toronto, Canada from July 15th – 21st. The ITRC occurs every four years and is the main forum for turfgrass scientists and extension specialists from around the world to discuss the latest research findings.

I have been attending the ITRC since 1989 where there were only five Australian representatives and it was pleasing to see thirteen Australian's at this conference.

At this conference there were 391 delegates including some turf managers. There were 225 papers presented, including 120 oral presentations and 105 poster presentations. The program included five symposia on: Turfgrass Transformation: Alien Genes and Practical Application; New and Emerging Pests; Environmental Impacts Beyond the Fairway; Distance Education and Water Repellency. In addition to the symposia, there were sessions on genetics and breeding, soil science, agronomy, pests and diseases and turf management.

The amount of information produced at such conferences is somewhat overwhelming, however, some of the particular issues that I thought were important are as follows;

1.Water, water quality and environmental management are considered to be the key issues facing turf researchers worldwide.

2.Compared to many countries, Australia has a relatively stable climate with very few of the environmental extremes encountered in many other countries. For example, in North America and Canada there are many areas that have to cope with –30 °C temperatures and snow in winter and 30 °C+ temperatures and high humidity in summer.

3.The most technical session of the conference was the symposia on Turfgrass transformation. This is the introduction of "foreign" genes into turfgrass species. This has been successfully achieved with the introduction of glyphosate and 'Finale' resistance genes into Agrostis sp., Festuca sp. and Lolium sp. Genetic engineering is a worldwide issue in a range of crops and has stimulated considerable debate on ethical, moral and philosophical grounds. The turf scene is no different.

One of the most interesting papers on this topic investigated the gene flow from transgenic creeping bentgrass to "wild" Agrostis sp. The movement of pollen is considerably further than what was previously believed and there is also interspecies crossing occurring. That is, there is potential for the implanted gene (for resistance to glyphosate) to be passed on from A. Stolinifera to A. Canina, A. capillaris and A. castellana. Given the problems of bentgrass infestation with pastures in areas of Victoria and NSW this provides a cause for concern when looking at control options.

4.One of the most interesting and well presented papers was by Dr. David Huff, a plant breeder from Penn State University. His paper discussed the work he has done in selecting and breeding *Poa annua* strains for golf greens. His work has been in response to the large number of golf courses in the USA where *Poa annua* is the predominant (and often the preferred) species. Dr. Huff has agreed to speak at next years AGCSA conference. He will be worth the price of admission on his own.

5. Sportsturf construction and in particular greens construction, still remains a hotly debated topic. Research from STRI-Bingley has shown that it is possible to use larger gravel sizes without experiencing particle migration; California style greens (ie no gravel layer) perform no differently than USGA profiles; in time, once a turf is established, the rootzone base has little or no influence on surface performance (however, this ignores the benefits of good drainage); moisture release curves and perched water tables may be more theoretical than what occurs in practice.

In terms of greens construction, the most obvious point was that no matter how well the profile is constructed, the on-going maintenance is absolutely critical to performance.

6.There were some interesting papers on bentgrass management, particularly under summer stress. Penn A1 consistently came up as having very good quality and the best heat tolerance. Penn G2, Penn G6 and Crenshaw also being good performers.

7.The education symposium concentrated on distance education and the use of the internet. An excellent paper presented by Dr Al. Turgeon (author of "Turfgrass Management") explained the complexities of remote / internet based teaching. Because it is essentially a "teacher-free" zone, there needs to be more detail presented in each unit of study and there is a need for information loops that allows the student to get up to speed in areas of deficiency.

8.The symposia on water repellency of soils provided some interesting insights to the management of dry patch conditions. One paper in particular clearly demonstrated that fungi are the main component of the microbial community that causes water repellency.

From the conference, I believe that there are several areas of research that we should look to develop and include;

- Continued bentgrass evaluation
- Look at long-term performance of USGA versus California styles of greens construction.
- Moisture/irrigation management using sensors.
- Summer stress management (warm and cool season grasses).
- Continue to select local ecotypes of bentgrass and couchgrass.

The ITRC conference reinforced the value of having an industry organisation that represents all turf groups. (eg Golf, Sportsfields etc) to represent the industry at all levels of government and to foster and fund research.

The conference also included the General Business Meeting of the International Turfgrass Society (ITS) and the following points of interest are reported.

- The ITS is funded by fees, with occasional payments of monies from the ITRC Conference (depending on profitability).
- John Neylan and Ian Chivers have been appointed as Directors of the ITS for 2001 – 2005.
- The next ITRC conference will be in 2005 in Wales

The ITRC is a stimulating event and provides the best opportunity to experience turf research at the cutting edge. It is a must for any person involved in turf research or consultancy. It also provides an excellent opportunity to meet with researchers from around the world. I am extremely grateful to the AGCSA for supporting this trip and I believe the information and contacts will continue to strengthen the AGCSATech operation.

If you wish to find out more about the ITS, please contact John Neylan on 03 98866200.

University of Guelph Turf Research Station

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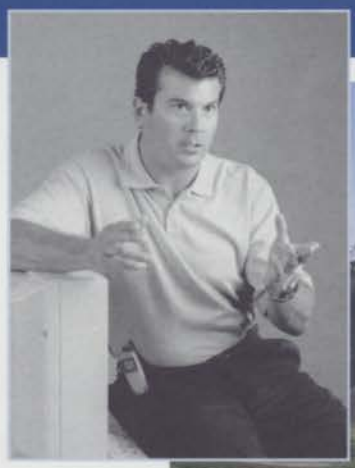

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new products

Tornado TM360 Debris blower

ASPAC Golf and Turf announce the release of the Tornado TM360 Debris blower,manufactured in the United Kingdom.

The Tornado Debris Blower was designed to cater for local government use as well as golf courses, and as a result has had to adhere to strict noise level restrictions, meaning the TM360 is the QUIETEST DEBRIS BLOWER on the market.

The adjustable blast diverter is also a unique feature, and enables you to divert the air flow to where it is required, down on wet or damp material, up for maximum movement across fairways, or to any angle depending on the throw required, or debris you are moving.

The very heavy anti-scalp roller on the rear of the TM360 ensures there is no gouging or marking of the turf in undulating conditions, and the rugged design of the TM360 means it will be an integral part of your fleet for many years.

The TM360 is available for demonstration in all states and territories of Australia, and all turf managers considering the purchase of a debris blower are urged to contact Martin Eade at ASPAC Golf and Turf on 1800 640 305 to arrange for further information, and a demonstration on your turf.

ASPAC Golf and Turf, Free call 1800 640 305, Fax 03 9708 6702, Mobile: 0412 357 880

Crown III Rubber Crumb Top Dressing

A revolutionary turf amendment product is now on the market in the form of a crumbed rubber top dressing by the name of "Crown III". Entyre Rubber Systems Pty Ltd has conducted several years of trials and tests in Australian conditions and proven just how effective this product is prior to the recent official release into the market place.

"Crown III" is manufactured from recycled tyres at Entyre Rubber Systems manufacturing facilities in WA and is currently being marketed nationally.

The principal of "Crown III" is relatively straightforward. Applied in 2-3 applications to an eventual thickness of approximately 20mm, the crumbed rubber is worked into the crown area of the turf providing Crown protection and minimizing damage allowing for rapid blade regeneration without the traditional damage to the root zone. But the truly unique thing about this product is that not only do you get this crown protection, but also due to the ideal heat retention in the root zone you get spring growth conditions throughout the winter months along with reduced compaction levels in the soils.

Ideal application areas are on golf tees & cart track ends, high traffic areas prone to wear, heavily shaded areas, general areas experiencing difficult turf growth & development.

Entyre Rubber Systems welcomes inquiries and has detailed reports available for further review.

Contact : Steve Mawhinney

Phone : 1800 676211

John Deere Spin Steer Lawn Mower turns heads

Last month heralded the long-awaited release of John Deere's revolutionary spin steer lawn tractor to John Deere dealers throughout Australia and New Zealand.

The Spin Steer Tractors (SSTs) offer consumers the perfect mix between zero-turn radius mowers, and ride-on lawn tractors.

SSTs are available in 16 and 18 hp automatic transmission units, and unlike all other zero-turn mowers on the market, are designed in an engine-upfront lawn tractor format with a steering wheel as opposed to the traditional hand lever controls found on conventional zero-turn mowers.

The zero-turn capability is due to differential steering, allowing the operator to turn 360 degrees to either the left or right of the vehicle's own dimensions. Each complete turn is less than half a rotation of the steering wheel. Power steering is standard on SSTs, a feature previously reserved only for larger tractors.

The mowing deck is raised and lowered by an easy to use dial-in height gauge, and a new foot-controlled implement lift system makes raising and lowering implements more convenient and smoother to operate.

Mower decks are available in 42" All Purpose mower deck for the SST16, or 48C 48" convertible mower deck for the SST18.

Reverse logic has also been built in, so the SST will operate in reverse like a conventional machine.

To find out more about these features and many more please contact your local John Deere dealer, freecall 1800 800 981, or visit: www.spinsteer.com

Oasis Turf Appointed Distributor For Lebanon Turf Products

A new and exiting partner ship between Lebanon Turf Products and Oasis Turf will see a unique range of granular slow release fertilisers in Australia this spring. Lebanon Turf Products are one of the leading manufacturers of slow release products in the world and their innovative range of nitrogen products is now available. The range consists of "Country Club" designed for greens, which uses Lebanon's unique methylene urea technology, as well as "NX-PRO" which is suited for higher cut turf. The NX-PRO range comprises different fertiliser technologies including, methylene urea, poly sulphur coated urea and MESA, the only nitrogen source that combines the colour response and benefits of ammonium sulphate with the staying power of methylene urea in a single particle.

Oasis Turf now supplies the best quality liquid and granular slow release technology in Australia.

For more information, call 03 9580 2488.

TURF INDUSTRY BOOKSHOP

A Field Guide to Australian Frogs	$49.50
A practical guide to Ecological Management on the Golf Course	$60.50
A New Tree biology & Dictionary (Two book set)	$170.50
Arborculture 3rd Edition	$115.50
Arboriculture	$99.00
Australian Weed Control Handbook: Tenth Edition	$77.00
Best Golf Course Management Practices	$209.00
Biological Control of Weeds	$44.00
Bird Conservation on Golf Courses	$66.00
Birdwatcher's Guide to the Sydney Region	$24.20
Color Atlas of Turfgrass Diseases	$187.00
Color Atlas of Turf Weeds	$187.00
Compendium of Turfgrass Diseases	$104.50
Confidential Guide to Golf Courses	$110.00
Controlling Turfgrass Pests	$220.00
Cricket Grounds	$132.00
Creeping Bentgrass Management	$127.05
Crop Weeds	$71.50
CSIRO Handbook of Australian Weeds	$55.00
Destructive Turfgrass Insect: Biology, Diagnosis & Pests	$163.90
Disease, Insect & Weed Control in Turf	$65.45
Diseases of Turfgrasses	$264.00
Drainage for Sportsturf and Horticulture	$38.50
Effluent Water for Turfgrass irrigation (leaflet)	$5.50
Encyclopaedia of Australian plants Vol 1	$99.00
Encyclopaedia of Australian plants Vol 2	$143.00
Encyclopaedia of Australian plants Vol 4	$143.00
Encyclopaedia of Australian plants Vol 5	$143.00
Encyclopaedia of Australian plants Vol 6	$143.00
Encyclopaedia of Australian plants Vol 7	$143.00
Fertilisers for Turf	$49.50
Field Guide to Eucalyptus	$99.00
Field Guide to Eucalyptus Vol2-S.W. & S. Australia	$104.50
Field guide to Eucalyptus Vol3 N. Australia	$170.50
Field Guide to weeds in Australia	$82.50
Flora of NSW Volume 3	$108.90
Flora of NSW Volume 4	$143.00
Fundamentals of Turfgrass Management	$121.00
Fundamentals of Weed Science	$148.50
GC Irrigation System Design and Drainage	$170.50
Golf Architecture	$88.00
Golf Course Architecture: Design, Construction & R	$170.50
Golf Course Constr, Renov and Grow In	$132.00
Golf Course Design	$188.75
Golf Course Management & Construction	$231.00
Golf Course Tree Management	$108.90
Golf Courses of Australia Software	$85.75
Golf Facility Planning	$170.50
Golf Has Never Failed Me	$66.00
Grasses	$24.20
Grasses of New South Wales	$39.60
Growing Australian Native Plants from Seed	$24.20
Growing Media for Ornamental Plants and Turf	$55.00
Guide to Golf Course Irrigation Systems Design & Drainage	$170.50
Handbook of IPM for Turf & Ornamentals	$231.00
Human Resource Management for Golf Course Superintendents	$88.00
IPM Handbook for Golf Courses	$137.50
International Turf Management Handbook	$209.00
Links Golf - The Inside Story	$60.50
Managing Turfgrass Pests	$209.00
Management of Turfgrass Diseases	$209.00
Managing Wildlife Habitat on Golf Courses	$104.50
Masters of the Links	$60.50
Manual of Grasses	$99.00
Modern Arboriculture	$141.90
Native Australian Plants: Horticulture & Uses	$77.00
Native Plants of the Sydney District	$88.00
Natural Turf for Sport & Amenity	$121.00
Noxious Weeds of Victoria	$55.00
Nursery & Landscape Weed Control Manual	$88.00
Organic Control of weeds	$17.60
Practical Golf Course Maintenance	$115.50
Practical Greenkeeping	$181.50
Rough Meditations (HB)	$65.50
Salt-Affected Turfgrass Sites: Assessment & Management	$152.90
Sands for Sports Turf Construction & Maintenance	$55.00
Seashore Paspalum	$148.50
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Sports Fields	$170.50
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Sports Turf: Science, Construction & Maintenance	$159.50
Spotting Soil Salting	$27.50
Superintendents Handbook of Financial Management	$88.00
The Care of the Golf Course	$104.50
The Committed to Green Handbook for Golf Courses	$33.00
The Complete Handbook of Pruning	$29.70
The Golden Age of Golf Design	$148.50
The Golf Course– planning, design, cons and maintenance	$148.50
The Links	$132.00
The Mathematics of Turfgrass Maintenance	$88.00
The Sand Putting Green: Construction & Management (leaflet)	$19.80
The Spirit of St. Andrews	$71.50
The Turfgrass Disease Handbook	$121.00
Tree Anatomy	$198.00
Tree Basics	$16.50
Tree Maintenance Sixth Edition	$115.50
Tree, Turf Ornamental Pesticide Guide	$66.00
Trees–Contributions to Modern Tree Physiology	$275.00
Turf Management For Golf Courses	$297.00
Turf Irrigation Manual	$137.50
Turf Spraying - A Practical Guide	$27.50
Turf Weeds and their Control (HB)	$185.90
Turfgrass Diseases and Associated Disorders	$71.50
Turfgrass Management	$192.50
Turfgrass Management Reduction Handbook	$132.00
Turfgrass Patch Diseases	$104.50
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Wastewater Reuse for Golf Course Irrigation	$198.00
Waterplants in Australia	$49.50
Waterplants in New South Wales	$38.50
Weeds an Illustrated Guide to Weeds of Australia	$115.50
Weeds in Australia	$82.50

VIDEO

Golf Course Maintenance for the Environment - A Strategic Approach	$110.00

Please note: All prices include GST.
Prices are subject to change without notice.

Destructive Turf Insects 2nd Edition

by Dr. Harry Niemczyk & Dr. David Shetlar

AGCSA Member Special $155

Peter McMaugh

The opening line of the introduction says it all "We offer this PRACTICAL book". Not only is it practical it is eminently user friendly. It offers great advice on identification, life cycles, controls and detection and monitoring.

The identification information is detailed and easy to use. The illustrations are clear whether they are line drawings or photos.

The approach divides the study into three, Soil Inhabitants, Crown & Thatch Inhabitants and Leaf & Stem Inhabitants.

While the insects dealt with are those of the U.S.A. and are not totally applicable to Australia the overall approach certainly is.

There are excellent chapters on Control Approaches and Programmes as well as curative programmes.

There are chapters on equipment and methods for detecting and monitoring populations.

This is easily the most informative and best teaching book of its type I have seen and it is well priced and deserving of a place in every turf man's library.

John Neylan

As a newcomer to turf, the first edition of this book provided me with a good understanding of insect life cycles, habits and detection techniques. This long overdue second edition is a practical and easy to read reference that should be on every turf manager bookshelf.

The book has divided the insects into three categories; soil – inhabiting, Crown and Thatch – inhibiting and Leaf and Stem – inhabiting pests. There are complementary chapters that discuss the principals of control for each insect group, control programs as well as chapters on insect detection and insect morphological terms.

The book is very well illustrated with line drawings and colour photographs.

While the insects are those of the USA, there are many insects common to Australia. However, a major strength of the book is the strategies and approaches to insect i.d and control that can be applied anywhere.

This book is informative, easy to read, well priced and a must purchase.

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FNQGCSA

With July and August being the driest on record, The Far North is looking more like central Australia than a lush Tropical Paradise. The demand on Irrigation systems is high with useable water supplies being stretched, and with September following the same weather pattern a rain dance may be required?

On 13th September a field day for the FNQGCSA was held at Tropical Lawns Turf Farm. Our host and Proprietor of Tropical Lawns Terry Anderlini put on a terrific day. Forty members and guests enjoyed some interesting demos from Nufarm and Honeycombes, along with some talks and discussion from Nuturf, R & R Fumigation, and Terry Anderlini on Novatek Turf. A BBQ lunch was sponsored by Tropical Lawns and Nuturf and a great day was had by all.

Thanks to Terry and his staff and everyone who assisted in putting the field day together.

Paul Earnshaw

President, FNQGCSA

QCSAQ

Well winter seems to have spent itself, we have had a blast of westerly winds and now it seems like spring is in the air. I would like to thank all those members who attended the AGM at Southport Golf Club for their participation, there was some full and frank discussions at the meeting and the input of the members is much appreciated.

The committee elected fro the upcoming year is:

President: Jon Penberthy

Vice President: Barry Cox

Secretary: Ben (boom boom) Tilley

Treasurer: Rod Cook

Education & Research Officers:

Pat Pauli - Kelly Hyland - Graham Sims- Jason Adams

I would like to welcome Graham Sims and Jason Adams to the committee, I am sure they will get to put their stamp on the future direction of this Association.

Thanks must go to Barry Moore and his team from Textron Turf Care Group, they were the sponsors of this day and have come on board as one of our associations major supporters.

They had a wide range of vehicles and interchangeable appliances from the Cushman Range that were put through their paces in a pretty unique way with the pit crew standing by to swap one implement for the next as they demonstrated corers, core harvesters, sprayers and topdressers for different applications. I was impressed with their A frame implement remover that seemed to make the job of changing tools on the Cushman very easy. Pit crew boss Gary Kelson showed his intimate knowledge of the product line and convinced us he really is a hands on manager. All in all, a very worthwhile demonstration of a wide range of gear. Thanks also to Stuart Moore the Superintendent of Southport Golf Club who was on holidays at the time but still presented the golf course in fine condition.

At the AGM our treasurer, Rod Cook, presented the auditors report which shows the Association is in a healthy position financially, Rod has done a great job getting the books into an easily manageable form.

One subject that arose at the AGM is concern at the numbers attending field days.

Some suggestions as to how to turn this trend around were put forward. Among them; less field days, education rather than golf, the AGM and the Golf Championships to be on the same day and pay for high quality speakers to get the numbers back up.

The Queensland DPI is forging ahead with efforts to get a state turf research foundation off the ground. Involvement from a wide range of turf related organizations is being sought for the purpose of coordinating some worthwhile research projects.

Late news, Queensland John Deere Cup winners were the team from Gainsborough Greens on a count back from Logan Golf Club. The event was played at Gailes Golf Club which was presented in immaculate condition by experienced turf manager Mr. Peter Newman who has previously had plenty of tournament experience being involved with numerous Queensland opens.

CALENDAR OF EVENTS

Thursday 8th November:
Golf industry Awards Night Dinner, so please get involved and register a vote.

Monday 12th November:
T & I sponsored GCSAQ educational day featuring Mr. Terry Woodcock from Sportsturf Consultants will be discussing turf related subjects including dormancy, disease and management practices. The educational side will take place at Southport Golf Club, members are invited to bring along a board member from your club. This will be followed by golf at the Glades Golf Club.

Saturday 8th December:
Wet and wild GCSAQ Christmas family day sponsored by Scotts Fertilisers.

Hope to see you at the up and coming events.

Jon Penberthy
GCSAQ President

GCSAWA

It is with pride that I present my first report as State President. I follow some illustrious names into this position and I look forward to continuing to support our members and helping the GCSAWA to steadily move forward. This job will be made much easier with the support of a dependable committee and I am fortunate to have a great team to work with for our state association. Andrew Fortune is joining the committee and is a welcome addition, providing a perspective from the younger turf manager.

I must take this opportunity to thank Rob MacDonald for his hard work and dedication to the association over the past few years. Rob has been a tireless worker during this time and for the last 2 years, as President, has been instrumental in the progress of the GCSAWA. I'm sure the AGCSA will benefit from Rob's participation and he will be an asset to the national association.

On the 16th August over 160 delegates enjoyed a diverse and interesting seminar organized by Nuturf. State Manager, Matthew Day, provided the audience with a wide variation of topics and speakers from around the world and the technical content was followed by a superb lunch in the member's lounge at Belmont Racecourse.

Our association AGM was held on the 28th August at Cottesloe Golf Club. This year we decided to hold the meeting in conjunction with round 7 of the John Deere Super Series. This proved most successful with many members taking advantage of a superb mornings golf at a beautifully presented Cottesloe followed by the AGM. An attendance of over 40 members was the best ever for the AGM. "Colonel" Jeff Austen was the winner of round 7, the bionic man in fine form! Following the AGM Lin Hambleton gave us his ideas and thoughts on the development of a manual for golf club operations. This sparked some interesting conversation and I'm sure this topic will continue to gain momentum with Lin's expert guidance.

The inaugural "Turfest" was held on 30th and 31st August at Challenger TAFE, Murdoch Campus. This event saw many different turf industry associations, companies and individuals pool their knowledge and ideas. I believe the event will become an annual event on the WA turf calendar.

Round 8 of the John Deere Super Series took place at Royal Fremantle on the 4th September with Andrew McKay from Yates storming home in the last group to win the day. Jeff Allen presented the fabulous golf course for us and we all look forward to round 9 at Sea View.

One of our more prominent committee members, Jeff Lane, recently introduced 6 sheep to his golf course, probably to cut down on mowing? I'm not sure if the course has improved with these additions to his team, but the Kiwi members of Gosnells are ecstatic! Local businesses report a dramatic increase in sales of smocks and gumboots!

I believe Mr. John O'Dell from Royal Sydney was a recent visitor to the "golden west". He was entertained by Geoff Kirk on a fishing trip to the north west of our state. Obviously the NSW bait he brought with him did the trick as he managed to receive some interesting WA press coverage regarding his "catch of the day".

On a more serious note, the lack of substantial rainfall this winter may cause turf management problems for some Superintendents. Personally, I will have some major issues regarding water management to address. With the introduction of water restrictions to the public every Superintendent will be affected in some way. Even if your own course has a good supply of water, please spare a thought for the local residents near your course who are severely restricted. Some simple communication to these residents can help pacify

them, when quite often they do not understand basic turf management procedures. I have contacted the local residents at Secret Harbour explaining a few of the "myths" regarding turf management and water use and have already had a great deal of positive feedback.

Good luck to you all in your spring renovations and lets all pray for a cool, wet summer! Fat chance!

Allan Devlin

President, GCSAWA

NSWGCSA

Now that spring is here, the industry is a hive of activity, with turf innovations in full swing. The general conclusion in NSW is that most people have had a fairly good relationship with "mother nature" over the last couple of months.

Since the last report our state has held its annual Cypress Lakes Golf Day in the beautiful wine growing area of the Hunter Valley, host superintendent Merv Hayward once again put on a tremendous day with his challenging golf course in fine condition despite. Highlights of the event included 2 separate "hole in one" efforts by Carl Wangeman from Yowani Golf Club who 'holed out' on the Sunday afternoon in practice. The same result on the next day would have won him a car! Bruce Kemp (Maxwell and Kemp) had his "ace" on the right day, but the wrong hole (can't help bad luck).

The main prize was again won by the very strong team of Andy Hugill, Scott Riley and his assistant David Boyd and of course, the very humble anchor man in Guy Thomas There will be much interest in next years event as these men are on the "Hat Trick". Many thanks to the sponsors of the day: Scotts, Globe, Fairway Turf, Aventis and Sharpes Tractors.

Our AGM was held recently at the Carnarvon Golf Club and several guests included Mark Couchman (President AGCSA) and Euan Laird (CEO AGCSA). The meeting went fairly smoothly with David Warwick (Avondale Golf Club and our representative on the AGCSA board) giving a very informative talk on his work with the International Audubon Society, which was so well delivered he is receiving 3 calls per week from superintendents interested in pursuing this avenue of environmental responsibility.

Toro Australia, our sponsors for the day gave two separate presentations involving the latest advances in the irrigation division (Pat O'Shanessy) while Roger Maher gave a stroll through the new product range of machinery available. Both sessions were well received and thanks again to Toro for their continual support of our AGM.

The AGCSA roving workshop will be held at Ryde Parramatta Golf Club on Wednesday 17th October, and I urge all members to attend as the topic (Time Management) is very current and relevant coming into Summer.

Thanks to the efforts of the AGCSA and relevant bodies in this state it appears that there will be research money available in the near future for bentgrass trial sites to be established in two different climatic regions of NSW. Anyone interested in having these trials conducted at their course can contact either myself or the AGCSA.

Manly Golf Club will be the venue for our final field day for 2001 and could well prove to be the most "balanced" day of the year; Professor Peter Martin and Peter McMaugh will lead an open forum discussion on the broad topic of organic systems for greens maintenance, various representatives from the industry will be invited to attend for what promises to be a "lively" debate. The day will also include lunch, golf and an informative and hopefully entertaining talk from Colin Montgomery's caddy (don't miss this day!).

See you at Ryde Parramatta in October.

Martyn Black

President, NSWGCSA

VGCSA

Mid September and the majority of Victorian Superintendent's have already had to dust off their irrigation hardware. With storage dams at approximately 50%, water restrictions in some parts of the state are a real possibility this Summer. We can only hope some decent late spring rains are on their way.

The VGCSA's 2001 country meeting was this year held at Warrnambool Golf Club. Over sixty people attended dinner at the Warrnambool Clubhouse on Sunday, with forty five in attendance for our meeting on Monday the 20th of August. Thank you to Geoff Peacock from Grass n Turf Rejuvenation Services for providing a hearty country breakfast and to our guest speakers in Tom Parent courtesy Simplot and Phil Ford from NMIT. A special thank you to our host Super, Ross Corbett and his family for organizing such a great weekend.

The final two meeting's for this year include a first time visit to the recently completed Heritage Golf Club on October 15 and a twilight meeting to be held at Patterson River Golf Club on December 10. An educational day has been organized for our October meeting with the theme for the day to be Greens Renovation Practices. A number of quality speakers have agreed to give presentations so to all members make sure to return your reply slips as early as possible as we are expecting a bumper attendance.

Finally the VGCSA is soon to initiate a "VGCSA New Member Procedure". I'm sure we can all relate to being a little anxious when we first walked into a room filled with your peers, and it our aim to provide a

support network to help new members to feel as welcome as possible.

A major initiative of the New Member Procedure is allocating mentors for all new members. A number of current Class A members have agreed to act as mentors having been chosen to represent regional zones, they are;

MELBOURNE METROPOLITAN REGION:

Tim Pierce - *Greenarces Golf Club*

Michael Picken - *Riversdale Golf Club*

EASTERN VICTORIA REGION:

Tony O'Rielly - *Yallourn Golf Club*

Steve Lociacono - *Cowes Golf Club*

Steve Tuckett - *Sorrento Golf Club*

NORTH & NORTH WESTERN VICTORIA REGION:

R Goulding - *Cohuna Golf Club*

NORTH EASTERN & CENTRAL VICTORIA REGION:

Tennyson Blake - *Shepparton Golf Club*

Mark Lambourn - *Mooroopna Golf Club*

Mick Swanwick - *Yarrawonga & Border Golf Club*

SOUTH WESTERN VICTORIA REGION:

Brett Balloch - *Anglesea Golf Club*

Mick Russell - *Werribee Park Golf Club*

Ross Corbett - *Warrnambool Golf Club*

Thank you to all of the above people for volunteering to act as mentors. I would particularly like to thank committee members Tennyson Blake and Tim Pierce who have been instrumental in setting up the above procedure. For more details regarding the VGCSA New Member Procedure please contact a committee member.

John Geary

President, VGCSA

SAGCSA

With the wettest start to spring on record, most courses are still very wet. Once things start to dry out we will be very busy just keeping the grass down. On average, we have had about 8-9 inches of rain for August and the start of September. It has been the wettest start to spring on record and we reached our September average in just 4 days.

We held the inaugural John Deere Teams Event at Belair Park Country Club and we were lucky enough to have had a fine late winter's day. The winning teams were Belair Golf Club and Tea Tree Gully Golf Club, with Kooyonga missing out on a count back. Good luck to Belair and Tea Tree Gully in Queensland.

Up coming events on the SAGCSA calendar include a bus trip to Meningie Golf Course on Sunday 14th October 2001, sponsored by Turf & Irrigation and Metropolitan Machinery.

Our next meeting will be held at Willunga Golf Course on Thursday 8th November 2001, sponsored by John Cox Agencies, featuring Enviromist products. On Sunday 9th December our annual Christmas picnic will be held at Belair National Park – all welcome. A great day, as always, will be had by all!

Shawn Standfield

President, SAGCSA

TGCSA

The TGCSA held its Annual General Meeting on Wednesday 29th August at the Launceston Golf Club.

OFFICE BEARERS (2001 – 2002)

President	Phil Hill
Committee	Clint Southorn
Vice President	Chris Hay-Ben Clark
Secretary	Shane Knott-Greg Newton
Treasurer	Danny Gilligan-Harry Skledar

Our Meeting was very short and sweet with discussion on educational activities for the next 12 months as well as discussion on the training package for Trainers and Apprentices.

The afternoon activities of our AGM were fulfilled by Pellows (Toro Agent Tas) who demonstrated the current release on the new Toro Groundmaster Series. Other machinery demos were also available on the 2 Master Mowers, Sidewinder 6500 and numerous other Toro equipment.

Our next event on the Turf Calendar is a seminar on 31st October which, will concentrate on; Weed Lifecycles and Biology, Control Mode of Action of herbicides. The afternoon session of this event will cover some more basics on greens mowers and machinery maintenance - watch your mailbox for your invite.

Preparation is also well underway for the end of year Field Day – Port Sorell 5th December.

Phil Hill

President, TGCSA

TGAA (Vic)

This is a synopsis of the presidents report tabled at the recent AGM.

The year has been one of change and steady as we go. The committee has had to come to terms with a new structure. It has taken time to grasp the tasks required to achieve the action plans put in place but to their credit we moved forward in all facets of the Association. Most goals were met and there are many initiatives for us to build on.

I commend the committee for their efforts during the year.

A special thanks to Bill Turner who navigated us through the GST start up. We now have a quality concise updated balance sheet at our fingertips. A tricky transition handled very professionally.

Activities included:

OHS DAY-MARCELLIN COLLEGE, BURSARS FIELD DAY HAILEBURY COLLEGE, CRICKET WICKET SEMINAR MCG and AGM

All activities were well attended and the content met the aims and objectives of the Activities Sub-Committee. Our ties with the Bursars has been enhanced further and the Victorian Cricket Association will continue to support us where possible.

The marketing sub committee have identified some key areas to maximize our exposure namely our website, buyers guide and sponsors package. The aquisition of our technology equipment is part of their initiative and now sponsors will be displayed at all our functions. We thank all our sponsors for their continued support and I ask you to consider them when you next purchase.

The committee is committed to providing high quality outputs at a reasonable price.

There is no way we could do this without the help of the sub-committee members who have joined the chairpersons. The input from everyone was invaluable and I hope more people will put their hands up this year.

As we have not had to pay for speakers for some time I would like to thank those who support us with their time and expertise. We attempt to offer proceedings where possible and a lot of time goes into the preparation of a talk.

David Teasdale is finishing up at Uxbridge Cricket Club in London and we are seeking applications for next winters lucky jet setter.

Congratulations to Heath Gillies from Optus Oval who received the TGAA Award for best NMIT sportsground apprentice 2000.

Since the last AGM there are two new chapters of the TGAA. NSW and WA are off and running. Both have over 250 members which, brings a total of roughly 1000 members nationwide. We have had some conference calls and ran a joint booth at the 17th Australian Turfgrass Conference in Sydney which was very succesful.

A few new faces on the general committee this year which should bring some fresh new ideas. It is made up of Bill Turner (Tres), Ian Beel (Sec), Tony Henry (VP), Rob Sundblom (VP), David Anderson, Jim Marchbank, Cameron Henley and Michael Houlihan. Simone will of course rally the troops.

Robert Savedra

TGAA(Vic)- President

TGAA, (ACT & surrounding region)

Excellent attendance at the recent AGM indicates the growing strength & support within the turf industry for the Turf Grass Association of Australia. Guest speaker for the night was the President of the Victorian Turf Grass Association & Head Curator for Wesley College, Rob Savedra. Rob spoke of chemical practices used at Wesley College, management problems experienced & some of the more memorable events that have occurred at the College. Pat Garret, a long time member, associate & benevolent friend to the ACT TGAA was awarded life membership at the meeting & was commended for his dedication to the turf industry.

Many of the previous committee members have again provided their services & some new members have come aboard. It is good for the Association to have new blood within the committee and gain valuable new input. Our previous President Paul Janssens agreed to run as President again, we all know what an excellent job he does. Thanks again Paul! Many thanks went to our members & sponsors, without their support we would not have made it this far. All in all the AGM was an informative and enjoyable night. For those of you who were unable to attend we hope to see you at the Christmas party.

The silly season is almost here again & this year the TGAA Christmas party will be held on Friday the 7th of December at the Yamba Sports Club. All members are encouraged to come along and indulge in the festive spirit. Another up-coming date to remember on the TGAA calendar is a Social Bowls day & BBQ to be held on Tuesday the 19th February, organized in appreciation of our sponsors & thanking them for their support throughout the years. It will be held at the Brumbies Sports & Social Club at Griffith.

Due to the on-going success of the Seminar, planning the 2002 Mid-year Seminar is well and truly on track and will be held on the 24th July.

Justin A K Haslam

Committee, TGAA (ACT & Surrounding Region)

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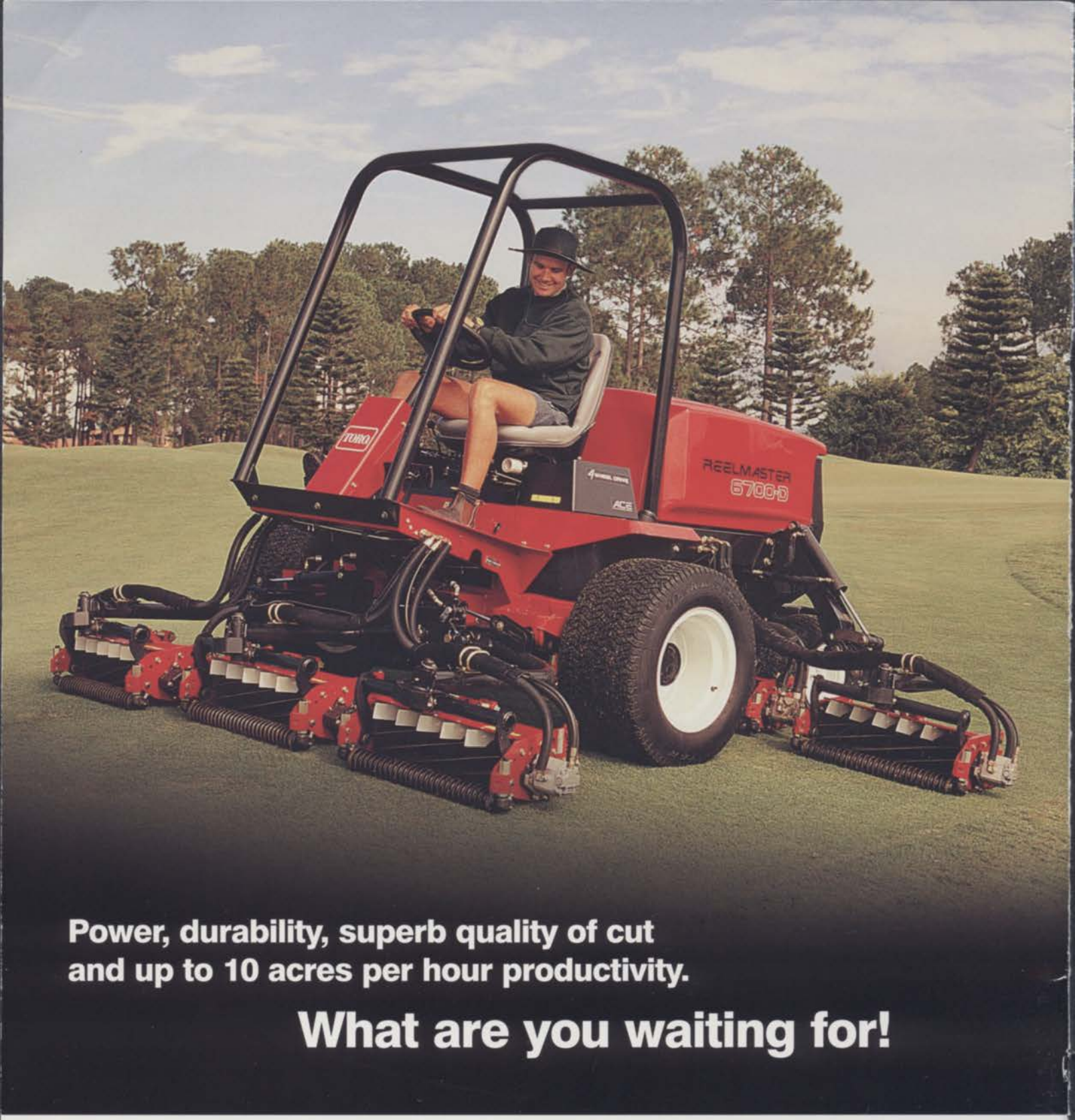

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