



Under the Microscope...

# Turf Research at Queensland's Redlands Park



Shade tolerance of different grasses grown under 50 per cent sunlight at the Redlands turf research facility

## Dr Don Loch from the Redlands Park Turf Research Group provides a snapshot of the facility's ongoing research work.

In the short period since moving into turf, Redlands researchers have built up a strong portfolio of projects. Prior to September 2003, a number of major projects received matching funding from Horticulture Australia Limited (HAL). However, with the subsequent hiatus on HAL funding of voluntary contributor projects in turf and other non-levy horticultural industries, there is now greater emphasis on developing contract research projects with full cost recovery. Some form of industry research levy would seem essential if turf research is to continue to advance strongly in Australia.

### GENETIC IMPROVEMENT

Genetic improvement is a core activity in the Redlands research program, which in time will include the breeding of new varieties supported by DNA analysis, tissue culture and other modern laboratory techniques.

Initially, however, the priority has been to assess the current range of cultivars and how well these meet the needs of Queensland and Australian turf managers.

### Redlands Turfgrass Collection

One of our first steps at Redlands was to develop a comprehensive collection of warm-season turfgrass cultivars. A maximum of 138 different vegetative and seeded warm-season turfgrass varieties can now be accommodated in unreplicated demonstration plots.

The Redlands collection also contributes to research and education elsewhere in Australia. For example, a subset of green couch (*Cynodon dactylon*) and zoysia (*Zoysia japonica*, *Z. matrella*) varieties have been provided for a collaborative project with the Northern Melbourne Institute of TAFE and the Victorian Golf Association to evaluate these new grasses at Metropolitan Golf Club.

### Breeding

The considerable amount of 'spade work' already done in the area of genetic improvement is finally leading to the development of a three-way collaborative turf breeding program involving the University of Queensland (Dr Chris Lambrides), QABC and Redlands Park.

### PHYSIOLOGY AND MANAGEMENT

A major research focus in the Redlands program has been the adaptation and management of warm-season turfgrasses: how the different species and cultivars respond to environmental and user-related stresses including water, salinity, shade, temperature, nutrition, wear, and chemical use.

### Salt-Affected Sites

The use of salt-tolerant turfgrasses has been a major focus in two projects, the first looking at re-vegetation of a bare eroded roadside site with the Queensland Department of Main Roads on the Sunshine Coast. Despite high salt levels (up to 22.5 dS m<sup>-2</sup>) and high acidity (pH 3.4-5.2) in the soil, seashore paspalum (*Paspalum vaginatum* – both Sea Isle 1 and Sea Isle 2000) established and thrived once soil fertility was improved.

To date, seashore paspalum has also been the main salt-tolerant species used in a second project 'Amenity Grasses for Salt-Affected Parks in Coastal Australia', which is funded by HAL and Redland Shire Council.

We are also trialling marine couch (*Sporobolus virginicus*), which appears to be even more tolerant of salinity, waterlogging and drought than the seashore paspalums, and future trials should include saltgrass (*Distichlis spicata*) as well.

In other trials, we have found that seashore paspalum and marine couch will grow well with little or no topsoil over the compacted mud profile – a few centimetres at most compared with at least 10cm of topsoil for green couch, blue couch, kikuyu, and buffalo grass.

Because of the variation in salt levels in the field, we are also characterising the relative salt tolerance of a wider range of turfgrasses in a series of glasshouse screening experiments, starting with the most salt tolerant species and working progressively through less tolerant species in future runs. In each experiment, plants are being subjected to six levels of salt in hydroponic solution from zero up to a maximum of 40 dS m<sup>-1</sup>.

### Soil Fertility

Different turfgrasses vary considerably in level of fertility required to maintain them in acceptable condition, but all require more than is currently applied to many areas of public open space.

Under the salt-affected parks project, an experiment with eight different turfgrasses has been established to determine minimum maintenance fertiliser requirements for low level parks and for high profile parks.



Salt-affected Sunshine Coast site 16 weeks after planting Sea Isle 2000 seashore paspalum. The site was bare prior to planting

**Chemical Tolerance and Use**

Redlands Park manages a chemical phytotoxicity testing site with commercial partners Nuturf and Bayer Environmental Science under the HAL-funded project 'Chemical Phytotoxicity Testing Facility for Warm-season Turfgrasses'.

The aim is to assist in the registration of new chemicals for turf use by generating supporting data on possible phytotoxic effects across a representative range of 28 warm-season cultivars from 16 turfgrass species in replicated plots.

Since mid-2002 when it was first established, the Redlands Park site has contributed to the registration of a number of turf herbicides and fungicides now on the Australian market. These include:

- Bayer's Spearhead herbicide, Verdant herbicide, and Rovral GT fungicide; and
- Nuturf Millennium herbicide, Monument herbicide, Heritage fungicide, and Subdue Pro fungicide.

**Turf Diseases**

Although we do not currently have a dedicated turf disease project, diseases seen in the various research and variety plots at Redlands Park and on community sports grounds across southeast Queensland are monitored by plant pathologist Kaylene Bransgrove.

Symptoms and fungi isolated from diseased turf are compared with records in the literature and in the Queensland fungal herbarium. The next step will be to inoculate warm-season turf varieties with known and suspected pathogens to investigate their pathogenicity and disease symptoms under Queensland conditions.

**SPORTSTURF MANAGEMENT**

**Greens Grass Management**

The range of new putting green grasses now reaching the Australian market is creating a predictable mixture of interest, excitement, confusion and consternation because nothing is known of their performance and requirements under Australian conditions.

In conjunction with the AGCSA, Redlands Park is initiating a project to assess the adaptation and management requirements of the range of new generation hybrid green couches and seashore paspalums.

This will involve two-way communication (coordinated by John Neylan) between researchers carrying out formal experiments on a test green on Redlands Park and superintendents managing replicated plots of the same grasses according to their own ideas on golf courses from Melbourne through to Cairns.

**FUTURE RESEARCH DIRECTIONS**

The turf industry and its component sectors must identify their needs and set clear priorities if future research is to remain relevant. But in the final analysis, it is the availability (and unavailability) of funds that will dictate which of those competing needs can actually be addressed. Scientific research these days is a business like any other – it will go where the money is.

Research priorities without the necessary funding support to be able to address them are nothing more than a wish list. The current challenge to all sectors of the turf industry is to develop long-term funding streams to support a growing capacity for Australian-based research as is now standard in more mature industries like wheat, beef, and wool. ♣

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The stormwater sampler at Manly Golf Club

**STORMWATER RESEARCH AT MANLY GOLF CLUB**  
By Bruce Simmons

A new national Cooperative Research Centre for Irrigation Futures (CRCIF) has been created to help save Australia's water resources. As a part of this

national research centre, the University of Western Sydney (UWS) will lead a key research venture to investigate efficient urban irrigation and the many possibilities of urban, industrial and rural communities sharing and re-using water.

UWS is combining with Manly Golf Club (superintendent Michael Bradbery) and Manly Council to research the sustainable use of harvested stormwater for groundwater recharge and irrigation onto the course.

This will have application for the more than 1500 golf courses throughout Australia, as many of these, particularly in urban areas, rely fully or partially on potable water supplies for irrigation of fairways and greens.

The project will also investigate the practices required to restore and sustain the local hydrology such that irrigation needs and environmental goals are met. UWS will investigate the potential for all urban golf courses to 'live within' their own hydrological

cycle thus contributing to the reduction of competition between urban supplies and peri-urban agriculture.

The main activities over the next three years will be:

- Developing an understanding of ground water resources in the area for quality and capacity for supply;
- Evaluating stormwater quality and quality for irrigation and groundwater recharge;
- Understanding (in concert with engineering designers) requirements for stormwater capture, storage and use for irrigation;
- Investigating water requirements for local wetland ecology and environmental flows;
- Developing a suitable decision support system and guidelines for best practices in the use of stormwater for golf course irrigation.