



IVMP
INTEGRATED VEGETATION
MANAGEMENT PROJECT

Finding a better way
to manage vegetation.



Project Update
August 2009



Project Partners



Dedicated to a better Brisbane



Industry Supporters



Bayer





Establishing best practice in vegetation management.



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The Integrated Vegetation Management Project (IVMP) is drawing together local and international knowledge and practice with the aim to assist the vegetation management industry in determining the best management practices and techniques for vegetation management.

Conducted over three years (December 2007 to December 2010), the IVMP is evaluating and confirming best practice methods to resolve specific mown vegetation management issues.

Outcomes from the research will integrate decision-making processes into mown vegetation management planning, design, construction, and maintenance. This will allow the development of a more economical and sustainable mown vegetation management model.

The IVMP is trialling integrated strategies using selected plant growth regulators, herbicides and nutrition. These are being combined with mowing and other cultural practices to determine the best combination of practices for various species combinations.

To learn more about this project or to share ideas with the project partners, visit www.ivmp.com.au.

The IVMP is trialling integrated strategies using selected plant growth regulators, herbicides and nutrition.



Integrated Vegetation Management at work in the United States

Above: Raleigh, North Carolina

Left: Sacramento, California

IVMP Lowering the cost of managing mown vegetation.

Executive Summary

The Integrated Vegetation Management Project (IVMP) is a collaborative research project being conducted in Australia from December 2007 until December 2010. Drawing on current knowledge and practice, both nationally and internationally, the IVMP will evaluate and confirm best practice methods in resolving specific issues with managing mown vegetation in Australia.

An overall increase in environmental knowledge and regulation, coupled with an ever increasing focus on safety, has prompted the implementation of current vegetation management methods that are responsive but often prohibitively costly. These current practices are not sustainable. Mown vegetation management is costly, dangerous and needs to be repeated often. Mowing also results in significant weed seed dispersal issues driving up ongoing management costs.

A need for greater knowledge about the effective management of mown vegetation, concerns about the potential off-target effects of chemicals and an understanding of the economic benefits of stabilising desirable plant communities, has prompted the decision to undertake this work.

Trial work is being conducted in Queensland and New South Wales by research scientists from Queensland Department of Primary Industries and Valencia Ecosystems. Funding has been committed by Technigro, Brisbane City Council and Gold Coast City Council with Horticulture Australia Ltd (HAL) matching voluntary funding contributions on a dollar for dollar basis. With in kind support from industry partners Bayer Environmental Science and Syngenta Crop Protection, the total project value is in excess of \$800,000.

The overriding strategic aim of the IVMP is the sustainable management of all classifications of mown vegetation and the improvement of undesirable 'weedy' species composition to that of a desirable, more manageable species composition. The expected benefits include a more economical and sustainable mown vegetation management model.



Top & Above: Difficult to manage situations.

IVMP For smarter solutions.



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Technigro is the lead partner in this collaborative research project. A first for Australia, the IVMP was established with the fundamental aim of finding a better way to manage vegetation.

Mowing is costly, dangerous and resource intensive. With the knowledge that current practices are unsustainable, the clear goal for the IVMP team is to develop a sustainable model for managing mown vegetation in public open spaces, such as parks, reserves and roadsides.

Over 3 years the project will trial innovative strategies using plant growth regulators, herbicides and nutrition, in combination with mowing and other practices, to determine the most economical, environmentally friendly and sustainable approach.

Technigro is proud to partner with other industry leaders as we work to develop smarter solutions that are safer, more cost effective and better for our planet.

For further information about Technigro, visit www.technigro.com.au.

Our aim is to lower the cost of managing public open spaces.



Mowing is costly, dangerous and resource intensive

IVMP Knowledge through research and collaboration.



Mr Steve Hampton
IVMP Project Manager,
Grow Solutions Pty Ltd

Steve is a qualified horticulturalist with 21 years industry experience across Vegetation Management, Landscape Construction & Maintenance, and Public Spaces & Facilities Management. Steve has formal qualifications in Business Management, Horticulture, Workplace Training, Project Management, Quality Assurance, Contract Management, and Workplace Health & Safety.

As Project Manager, Steve is responsible for the overall success of the Project. Steve's role includes identifying, tracking, managing and resolving project issues, proactively disseminating project information to all project partners, and proactively managing scope to ensure that what was agreed to is delivered, unless changes are approved through scope management.



Dr Fred Yelverton
Associate Professor, Department of Crop Science
North Carolina State University

Dr. Fred Yelverton is a noted turfgrass weed expert and lecturer from North Carolina State University in the United States. Dr Yelverton has been a principal researcher on a number of projects in the United States exploring seed head suppression, new herbicides (such as the sulfonylurea's), Vegetation Management Under Guardrails, Low Maintenance Turfgrass and Management Systems to name but a few.

Dr Yelverton will provide an invaluable link with the US, where significant trial data information is available. This trial data will be reviewed. Where potential is identified for Australia the trial work will be replicated as part of this project



Mr Travis Gannon
Research Scientist
North Carolina State University

Working with Dr. Fred Yelverton since 1999, Travis has coordinated projects in all facets of turf, including sports turf, amenity turf, golf courses and roadsides. A major focus for Travis has been his work with North Carolina's Department of Transportation (NCDOT) developing Integrated Vegetation Management (IVM) programs for roadsides and other non-crop areas. This work has included strategies to convert existing roadsides to low maintenance species and application placement technologies for herbaceous vegetation management, utilising both herbicides and PGRs.

B.S. Technical Agronomy - North Carolina State University
M.S. - Weed Science - North Carolina State University
Establishment and allelopathic potential of Centipedegrass (*Eremochloa ophiuroides*) along rights of way



Dr Sheldon Navie
IVMP Project Research Scientist
University of Queensland

Dr Sheldon Navie brings a significant amount of scientific knowledge to the IVMP project team, particularly in the fields of plant ecology, weed biology, and grass taxonomy and identification.

Dr Navie is based at the St. Lucia campus of the University of Queensland, where he has undertaken various roles with numerous internal and external organisations including teaching plant and weed identification to undergraduate students, the supervision of higher degree students researching the biology and management of weed species, and the development of interactive teaching tools for undergraduate students and the wider community. In recent years, Dr Navie's expertise has also been utilised by Biosecurity Queensland, Brisbane City Council and the Queensland Herbarium on projects involving the profiling and risk assessment of weed species.

IVMP Knowledge through research and collaboration.



Dr Henk Smith
Australasian Technical Services Lead
Syngenta Turf, Australasia

Dr Henk Smith brings a wealth of experience and expertise to the project team, providing increased technical focus and vast scientific information.

Joining Syngenta's legacy company, Zeneca, as a Field Biologist in 1999, Henk had previously worked with the Agricultural Research Council of South Africa, as Chief Pathologist for subtropical crops.

Prior to his appointment with Syngenta Australasia, Henk held the position of Product Manager - Seed Treatment, Turf and Ornamentals for South Africa. During this time he developed a strong global network within the turf industry.



Mr Jyri Kaapro
Research & Development Specialist Bayer
Environmental Science M.Agr. Sci. (Turf Management)

Jyri is responsible for the research and development of Bayer's new and current chemicals in turf and related industries. This is done by conducting field evaluation and development trials. The data generated is required for new product registrations, label extensions and product promotions.

In addition he provides technical support to Bayer staff and clients in such areas as product training, market development and demonstration trials. Prior to joining Bayer, Jyri was the Research Manager at the Australian Turfgrass Research Institute.



Mr Rod Wood
Technical Consultant
Brisbane City Council

Rod has over 45 years experience in weed management and is widely considered as one of Australia's leading authorities and advisers on weed management.

Over the years Rod has written a number of extension papers on weed control and has earned recognition for value adding and finding solutions to difficult weed problems. In his role with Brisbane City Council, he has developed over 10 technological innovations, including the Sensor vehicle and the Aquatic Weed Harvester; to improve ergonomic, safety and operational efficiency. Rod was the recipient of the Weed Society of Queensland Award in 2007.

IVMP Finding a better way to manage mown vegetation.

Introduction

Since the development of public assets, nature has challenged the integrity and function of those infrastructure assets with vegetation growth. Such challenges for modern asset managers range from risk minimisation, to the safety of asset users, to premature deterioration of the asset, to negative impacts on the environment where the asset is located.

Over the past fifty years, intensive mowing and the application of non-selective herbicides have been the predominant methods used to manage mown vegetation environments in Australia. More stringent environmental laws and standards, rising costs and increased public interests, necessitate the exploration of more sustainable and environmentally responsible methods which incorporate new technologies and incur lower ongoing maintenance costs.

In past decades, international vegetation managers in countries such as the United States, Canada and Mexico have developed a decision-making process known as "Integrated Vegetation Management", which has been defined as "a response to poor vegetation management."

Poor vegetation management practices have ranged from blatant neglect to 'mow only' programs to blanket applications of knockdown herbicides. International public asset vegetation managers have recognised the need to better manage the plant communities that will meet identified goals.

Background

In Australia, there is little known about the triple bottom line economics of managing mown vegetation or the actual life-cycle costs of vegetation management activities. An overall increase in environmental knowledge and regulation, coupled with a focus on safety, has prompted implementation of vegetation management methods that are responsive but often prohibitively costly.

Current practises are not sustainable. Mowing is costly, dangerous, time consuming, needs to be repeated often and has lead to weed seed dispersal increasing the cost of ongoing management. Such high-cost vegetation management activities have in many cases, exhausted the limited available resources especially at seasonal growth peaks during the busiest times of the year.

In such situations, resources dedicated to repetitive vegetation management activities could have been devoted to implementing more sustainable processes as part of an integrated strategy. Innovative new ways to manage undesirable vegetation must be developed that meet the goals of both asset owner and asset manager, making the best use of limited resources.

That is, there needs to be a holistic approach to addressing the problems faced with vegetation management in Australia. To achieve this there needs to be an understanding of the life cycle, seasonal cycle, species composition, population dynamics and a range of environmental conditions.



Top: Mowing – an unsustainable practice.

Above: Weed control around roadside furniture; another significant challenge



Top: Public Safety - A major concern.

An environmentally, socially and economically sustainable model for managing mown vegetation in public open spaces.

Project aim and objectives

The key project aim is to conduct research through scientific evaluation and practical field trials that identifies and tests a range of best practices, technologies and tools with the following objectives:

1. An environmentally, socially and economically sustainable model for managing mown vegetation in public open spaces
2. Proven strategies for improving the quality of the managed area
3. Proven strategies for the cost effective management of mixed species
4. Cost effective strategies for areas populated by predominantly undesirable grasses, and
5. Identification of the plant species most appropriate for each given situation

There are many benefits that can be realised through the implementation of the IVMP. These are based around quality, safety and environmental benefits, which over time will lead to a reduction in costs associated with mown vegetation management. These benefits are displayed in the following IVMP Model (Figure 1):



Figure 1. The Integrated Vegetation Management Project Model

Project methodology

A review of international literature on Integrated Vegetation Management and scientific study is being combined with practical field trials to identify the most appropriate vegetation management practices in Australia for:

- > Mown open spaces (urban and non-urban)
- > Mown roadside vegetation (urban and non-urban)
- > Amenity turf and sporting turf environments.

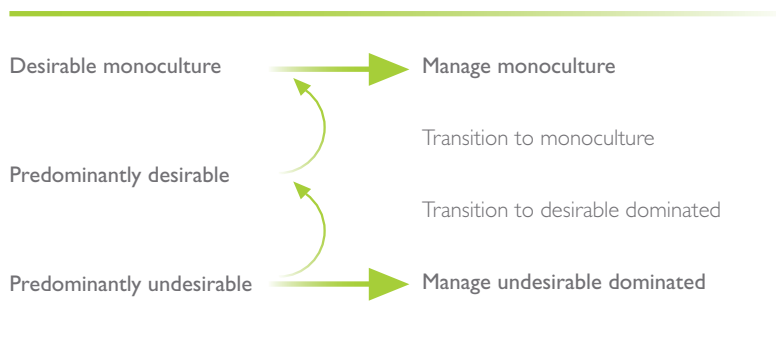
An internationally experienced project team is focussing on three vegetation classifications that will best represent species composition across all managed environments. These classifications are:

1. Desirable monoculture
2. Mixed species - predominantly desirable
3. Mixed species - predominantly un-desirable grasses

To ensure that the project outcomes meet the requirements of the amenity horticulture and roadside vegetation environments, strategies are in place that will ensure that the IVMP is readily adaptable to the environment in which it is implemented.

The overriding strategy of the IVMP process is the sustainable management of all classifications of mown vegetation and the improvement of undesirable species composition to that of a desirable, more manageable species composition, as represented in the following IVMP Strategic Model (Figure 2).

Figure 2: The IVMP Strategic Model



Top & Above: Bahia grass; a management problem in South East Queensland

Strategies are in place that will ensure that the IVMP is readily adaptable to the environment in which it is implemented.

Field trials

The IVMP is trialling integrated strategies using plant growth regulators, herbicides and nutrition, in combination with mowing and other activities, to determine the combination of activities that best suits the species composition present in each classification.

Trials are being conducted in amenity horticulture and roadside vegetation environments over three growing seasons. These sites include public open spaces such as parkland and roadside sites that border environmental areas within the Gold Coast and Brisbane regions, with both State and Local Government ownership. Trial work is also being conducted in Sydney in similar situations with field trial replications at the DPI research facility at Redland Bay, Queensland.

Project results are being made available to the project's funding partners at the end of each year for the duration of the project life. Progress reporting is also being delivered on a quarterly basis with a commitment that positive findings, as a result of the project, will be implemented as soon as practicable.

Trials are being conducted in amenity horticulture and roadside vegetation environments.



Above: Tinchitamba trial plots

Left: Roadside monitoring sites

Project outputs

The project outputs will include the development of:

- > A model for better managing mown vegetation in open spaces, such as parks, roadsides and amenity turf
- > New technologies and expanded registrations of pesticides and other chemical products for the turf and amenity horticulture industries
- > New and expanded uses for existing turf varieties
- > Categorisation of the optimal plant species for major situations
- > A decision tree to assist asset managers

Specific outputs created by the work being undertaken will include:

1. Best practice guidelines
2. New application guidelines
3. New and expanded chemical product registrations

Project outcomes

Three key outcomes have been identified and the methodology for the evaluation, measurement and assessment of the project against these outcomes are as follows:

1. Strategies to deliver a 25% reduction in the triple bottom line cost of managing mown vegetation, when compared with conventional practices currently in use
2. Proven strategies that offer a quantifiable reduction in the risk for all stakeholders (asset owner, manager, user), measured utilising a risk scorecard methodology
3. Proven strategies that offer better environmental management and resource usage outcomes, measured by reductions in carbon emissions, vegetation biomass and erosion



Top: Current situation
Above: The future?

Proven strategies that offer a quantifiable reduction in the risk for all stakeholders.



Top & Above: United States IVM - Using native grasses and low-growing flowering trees in the transition zone

In May 2008, screening trials of a range of chemicals began at the DPI&F research facility at Redlands

Project Update: Year One

Background research commenced in December 2007 with a focus on identifying and reviewing relevant literature and prior research activities related to the IVMP Project.

Following the initial review and following consultation with members of the IVMP Technical Team, the team met in Sydney for the first Technical Team Meeting in February 2008. At this meeting the team developed formal meeting ground rules, reviewed the criteria for potential trials sites, discussed refinements to draft trial protocols and confidentiality, and discussed the use of the internet as a vehicle to communicate project information to project partners and other stakeholders. It was also decided that quarterly reporting should mirror the format HAL require for the Milestone Reporting, with each quarterly report building towards the Annual Milestone Report.

In February 2008 planning commenced for the project web portal. The Technical Team finalised the scope and a web brief and quotation was received for the build of the IVMP portal. Project reporting and communication requirements were considered and it decided that the secure web portal was the preferred communication vehicle for both confidential and public project information sharing and communication.

Construction of Stage One of the web portal commenced and was completed in July 2008 and final communication systems were implemented in September 2008. The Technical Team met again twice in March and June to finalise trial site locations and requirements, trial protocols and project communication. Access into the DPI trial plots for the initial phytotoxic trials was also negotiated with Syngenta who had leased half of the trial plots at the Redlands Research Facility for a three year period.

In February 2008 work also commenced on the development of the trial protocols for the field efficacy trials. Trial sites for efficacy trials were investigated along with terrain and climate conditions. In May 2008 approvals for the use of field trial sites were sought. Initial efforts focussed on the undesirable species to be targeted, along with species lifecycles, seasonal cycles, composition, population dynamics, seed head heights and prevailing environmental conditions.

In March, April and May 2008 presentations introducing the IVMP project were delivered to a wide range of stakeholders involved in vegetation management in SEQ including Local Government Managers and Supervisors, Vegetation Management Contractors, Golf Superintendents and Industry supporters. During the same period educational forums were conducted with staff with vegetation management responsibilities who are employed by project contributors / partners.

In May 2008, screening trials of a range of chemicals began at the DPI&F research facility at Redlands. The chemicals tested in these trials were products considered to have potential in assisting in the management of the undesirable grass species. The trials were conducted to evaluate the phytotoxic effects on desirable turfgrass species.

In July 2008, a research trip to the USA was completed by project representatives. The purpose of the visit to the US was primarily to look at mown vegetation management, specifically integrated vegetation management strategies from nutrition and appropriate species selection, through to the use of Plant Growth Regulators and herbicides with growth regulatory effects. The project representatives met with a broad spectrum of professionals involved in vegetation management in the US so as to better understand the successes and challenges faced by asset owners, asset managers, Vegetation Management service providers and product suppliers

Project Update: Year Two

Preparation for Year Two of the IVMP commenced in August 2008 through September 2008, with the Technical Team reviewing Year One trial data, finalising the protocols for the Y2 Phytotoxicity trials and developing protocols for the field efficacy trial work.

Members of the Technical Team also sought approval for the use of suitable trial sites for the field efficacy trial work in both Queensland and New South Wales throughout October and November 2008. Project Partners Brisbane City Council approved a site within the Tinchi Tamba Wetlands Reserve at Boondall, Gold Coast City Council approved a site within Albert Park, Broadbeach Waters and with support from Hornsby Council in Sydney, a trial site within Fagan Park was established.

The continuation of screening trials to evaluate products considered to have potential in assisting in the management of the undesirable grass species was undertaken in Y2 by the Turf Research Scientists at the DPI Redlands Research Station.

Evaluations commenced in December 2008 assessing the phytotoxic effects of the IVMP products on twenty eight desirable turfgrass species during the summer season of 2008. The trials were placed over the same plots as the Y1 Phytotoxicity trials, ensuring two years of data over corresponding plots undertaken during two different seasons; Autumn Y1 and Summer Y2.

Field Efficacy Trials also commenced in December 2008, with Valencia Ecosystems engaged to complete the trial work at two sites, Tinchi Tamba in Brisbane and Fagan Park in Sydney. The focus of these field trials was to evaluate the efficacy of selected growth regulators and herbicides in managing problematic grass species in open space reserve situations, with particular emphasis as to their effects on growth regulation, seed head suppression and species composition conversion.

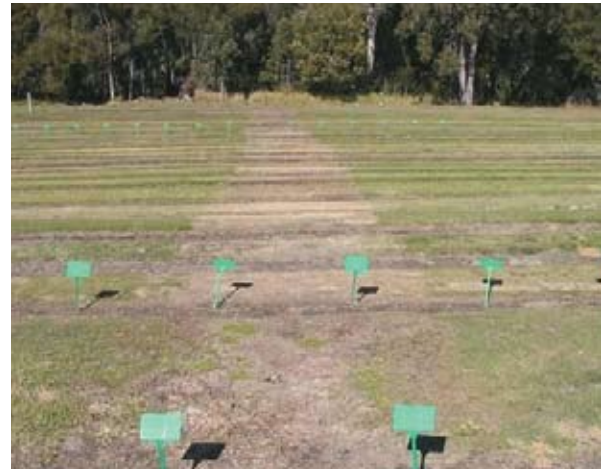
The Field Efficacy Trials ran for a period of three months with repeat applications of sixteen different treatments, as determined in the trial protocols, applied throughout the peak growing season. The results of the field efficacy trials were particularly encouraging, highlighting both seed head suppression and control options for the target weed species Bahia grass (*Paspalum notatum*) and other *Paspalum* species including a widespread problem in Australian amenity turf, Common *Paspalum* (*Paspalum dilatatum*).

Results from Y2 trial data suggest a number of IVMP treatments with potential in suppressing growth and seed head production. This would translate into significant broad ranging benefits to asset owners and those managing mown vegetation. As an example, in situations where areas are dominated by an undesirable such as Bahia grass, the trial data suggests that there would be a range of environmentally responsible, sustainable options available to significantly reduce mowing requirements during the peak growing season. Further to this, in situations where areas are dominated by desirable species, the trial data suggests that the IVMP has unearthed a number of tools that may be suitable for use in the removal of undesirable *Paspalum* species using either unscheduled or Schedule 5 herbicides with a far greater degree of human and environmental safety than the arsenate based products currently used.

To further explore these exciting developments, in June 2009, Dr Sheldon Navie from the University of Queensland joined the IVMP Technical Team in a Research Support role. Dr Navie's focus is to review the IVMP trial data, other IVM research data from similar projects and to communicate with the various project partners, collaborators and research agencies both in Australia and internationally.

Also in August 2009, the IVMP has arranged for Research Scientists from the North Carolina State University (NSCU) to visit Australia. This visit has been planned to coincide with a number of events in Australia, including:

- > the Vegetation Manager's Forum to update the IVMP Project Partners,
- > a review of Integrated Vegetation Management (IVM) Programs implemented by Technigro to manage roadside vegetation and amenity turf in partnership with Gold Coast City Council and the Queensland DOT, and
- > the final planning meetings of the IVMP Technical Team to determine strategy for Year Three of the project.



Top & Above: Phytotoxicity trial working at DPI Research Station, Redlands



Integrated vegetation management at its best in North Carolina

The purpose is to make options available for commercial use as quickly as possible.

Year Three: The road ahead

Whilst Year three is in the process of being finalised, the proposed direction for the project involves the following three pronged approach;

1. The evaluation of programs for the lead technologies; selecting the most promising methodologies and evaluating these in programs conducted in field situations where Bahia grass and Common Paspalum dominate the vegetation cover. The purpose is to make options available for commercial use as quickly as possible.
2. The optimisation of other technologies which international experience and scientific literature identify as having potential, but may not have performed well in trials during Year two. This poor performance has been identified as being possibly due to the product rate selected or application interval. These products require further evaluation in shortened programs for efficacy against Bahia grass and other Common Paspalum species.
3. The evaluation of products in shortened programs for efficacy trials on a broader range of identified problem weed species, including Rhodes grass (*Chloris gayana*), Green Panic (*Panicum maximum*), Pitted bluegrass (*Bothriochloa decipiens*) and Sheda grass (*Dichanthium annulatum*).

Further to this, aligned project and extension work is being considered for separate yet aligned trials with both Gold Coast City Council and the Department of Main Roads. It is proposed that in conjunction with their service provider Technigro, trial work be conducted to evaluate the integration of IVM strategies into current mowing operations to assess the cost / benefit of modifying the current mown vegetation management practices.

The respective projects will involve;

1. The identification of desirable and undesirable plant species within the trial area
2. Establishing an understanding of species composition for the roadside vegetation in the trial area
3. Development of IVM strategies based on intervention heights and contract management requirements for the mown vegetation within the trial site
4. Applying treatments with growth regulatory / seed head suppression qualities to undesirable species within trial site
5. Monitoring / measuring the performance of these treatments against the desired outcomes of the trial
6. Undertaking a cost benefit analysis measuring management utilising IVM Strategies v Current Practises
7. Reporting to clients and their customers regarding trials, program activity and program results

IVMP Website

For the latest IVMP news and project updates; to join in on discussions with the experts or to receive vegetation research and management updates, go to www.ivmp.com.au.

IVMP Newsletter

The Integrated Vegetation Management Project (IVMP) will be producing quarterly email newsletters sharing vegetation management research, project news and related articles. To sign-up and have this informative newsletter delivered to your inbox, register on the IVMP website.

For more information on IVMP:

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