

Summary of Linkage Projects Applications for Funding to Commence in 2006

Western Australia

The University of Western Australia

LP0669233 Dr JM Balme; Prof JR Dodson

Approved Project Title **Aboriginal landscape transformations in south-west Australia**

2006 : \$61,555

2007 : \$126,682

2008 : \$128,083

2009 : \$62,956

Primary RFCD 4302 ARCHAEOLOGY AND PREHISTORY

APA(I) Award(s): 1

Partner Organisation(s)

Dept. Conservation and Land Management
South Coast Regional Initiative Planning Team
South West Catchments Council

Administering Institution The University of Western Australia

Project Summary

This project will inform present day land management strategies by assessing the extent to which the landscape at the time of European colonisation was an artefact of management practices of Indigenous people. The strong Indigenous input, including the detailed recording and analysis of local knowledge together with evidence from archaeological, palaeoenvironmental and historical sources, will reinvigorate Aboriginal connections to land and provide appropriate training for young Indigenous people. The results will also assist in achieving sustainable use of Australia's biodiversity. The importance of human impacts relative to environmental change caused by other factors will improve our national capacity to respond to climate change.

LP0669047 A/Prof M Barbetti; Prof Dr K Sivasithamparam; Mr D Phillips

Approved Project Title **Role of soil factors and transmission on propagation material of fungal pathogens in the severity of strawberry crown and root disorders**

2006 : \$35,000

2007 : \$70,000

2008 : \$75,000

2009 : \$40,000

Primary RFCD 2704 BOTANY

APA(I) Award(s): 1

Partner Organisation(s)

DEPARTMENT OF AGRICULTURE WESTERN AUSTRALIA
AGRICULTURAL PRODUCE COMMISSION

Administering Institution The University of Western Australia

Project Summary

Through identification of the pathogen complexes associated with root and crown disorders, their impacts, understanding the influences of environmental conditions and rotational species, knowing the sources of major pathogens, and identification of varietal resistances to the pathogens, this project will provide a unique opportunity for growers to better manage such disorders of strawberries occurring across southern Australia. Benefits include prevention of severe losses in strawberries, making strawberry production and exports more viable, sustainable and environmentally friendly, addressing the National Research Priority 'An Environmentally Sustainable Australia' and the Priority Goal of 'Transforming existing industries'.

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LP0669595 Prof ME Barley; Dr M Fiorentini; Dr J Mavrogenes; Prof HS O'Neill; Dr SW Beresford; Dr BA Grguric

Approved Project Title **Experimental constraints on Platinum-Group Element geochemistry: developing lithochemical exploration tools for nickel-sulfides in mafic and ultramafic systems**

2006 : \$43,000

2007 : \$80,000

2008 : \$37,000

Primary RFCD 2601 GEOLOGY

Partner Organisation(s)

AMIRA International

Administering Institution The University of Western Australia

Project Summary

Nickel contributes approximately \$2 billion per year to Australia's export income. Currently 80% of that is coming from sulfide deposits, which are expected to be exhausted within thirty years barring significant new discoveries. Discovery rates have been declining for two decades, as the 'easy' targets have been found, despite a broad increase in nickel exploration expenditure to current levels of around \$50 million per year. There is a pressing need for new data sets and techniques to allow industry to target new discoveries based on limited drill sampling of potential host rocks. This project forms part of a broader program to harness the igneous geochemistry of the platinum group elements as a powerful pathfinder in nickel exploration.

LP0669748 A/Prof HT Chua; Dr L Gao; Prof CL Raston

Approved Project Title **Near zero-emission hydrogen and carbon production from natural gas and bio-methane**

2006 : \$57,500

2007 : \$105,000

2008 : \$90,000

2009 : \$42,500

Primary RFCD 2906 CHEMICAL ENGINEERING

Partner Organisation(s)

Wesfarmers Energy Limited

XLTech Group

Administering Institution The University of Western Australia

Project Summary

Hydrogen is envisaged as a clean fuel for power generation particularly for the transportation sector. In the short- and mid-term future, hydrogen will be derived from fossil fuels. Based on the conventional processes, the route from fossil fuels to hydrogen invariably produces greenhouse gases. Geosequestration is a viable technique of storing carbon dioxide but has an uncertain long-term environmental ramification. In contrast, our proposed technique avoids the production of greenhouse gases and, instead, engenders high value added graphitized carbon as a by-product. Given the relative stability and value of graphitized carbon, our catalytic cracking process provides another option to geosequestration.

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LP0669757 Prof JT Lambers; Dr SL Krauss; Dr JM Koch; Dr EJ Veneklaas

Approved Project Title **A molecular ecophysiological assessment of the importance of using local provenance seed in plant biodiversity restoration.**

2006 : \$64,000
2007 : \$128,500
2008 : \$141,500
2009 : \$149,500
2010 : \$110,000
2011 : \$37,500

Primary RFCD 3008 ENVIRONMENTAL SCIENCES

Partner Organisation(s)

Botanic Gardens and Parks Authority
Alcoa World Alumina Australia
Worsley Alumina Pty Ltd
Greening Australia Ltd

Administering Institution The University of Western Australia

Project Summary

The rehabilitation of Australia's unique plant diversity, following disturbance, is an increasingly important activity nationally, involving industry, government and community. The use of local seeds is recognised as best practise, but how local is local? We will use molecular tools to identify the extent of local seed transfer zones, conduct trials to assess the relative performance of local and non-local seeds (is there a home-site advantage?), and assess the consequences of mixing provenances for future generations. We will work closely with industry and community restoration practitioners to improve the effectiveness of restoration, with benefits flowing nationally through general provenance guidelines.

LP0669035 Prof SB Powles; Prof JW Forster; Prof GC Spangenberg

Approved Project Title **Gene identification and genetic marker analysis of herbicide resistance in *Lolium rigidum***

2006 : \$71,500
2007 : \$142,000
2008 : \$150,500
2009 : \$80,000

Primary RFCD 3002 CROP AND PASTURE PRODUCTION

Partner Organisation(s)

Agriculture Victoria Services Pty Ltd

Administering Institution The University of Western Australia

Project Summary

Herbicide resistance threatens the vibrant, export-focused Australian cropping industry and environmental sustainability. The Australian herbicide resistance problem is far greater than elsewhere in the world. Herbicide resistance must be avoided, managed and reversed to ensure profitable agriculture and an environmentally sustainable landscape. This research will contribute to the national wealth through helping ensure the profitability of vital Australian export agricultural industries and the sustainability of the soil/land resource. This proposal will ensure that Australia leads international herbicide resistance research and will enable the capture of intellectual property and commercial opportunities.

Summary of Linkage Projects Applications for Funding to Commence in 2006

LP0669873 Prof Z Rengel; Mr RE Wilson; Dr TL Setter

Approved Project Title **Physiological and genetic mechanisms underlying tolerance of bread wheat to ion toxicities**

2006 : \$40,000

2007 : \$80,000

2008 : \$89,500

2009 : \$49,500

Primary RFCD 3002 CROP AND PASTURE PRODUCTION

Partner Organisation(s)

Department of Agriculture WA

Administering Institution The University of Western Australia

Project Summary

Ion toxicities associated with acidic or alkaline soils and waterlogging cost about \$190 million per year in lost yield in Western Australia alone. Soil ameliorants and agricultural measures to deal with these constraints are non-existent (B toxicity in alkaline sodic subsoils), non-effective (liming of acidic subsoils), expensive (drainage for waterlogged soils) or a combination of the above. This project will characterise wheat genotypes for tolerance to ion toxicities and will lay the groundwork for deliberate breeding effort toward pyramiding tolerance to ion toxicities in elite germplasm.

LP0669878 Prof Z Rengel

Approved Project Title **Role of organic matter and soil biota in optimising crop nutrition in sustainable farming systems**

2006 : \$70,000

2007 : \$140,000

2008 : \$140,000

2009 : \$135,000

2010 : \$140,000

2011 : \$75,000

Primary RFCD 3002 CROP AND PASTURE PRODUCTION

APA(I) Award(s): 2

Partner Organisation(s)

Era Sustainable

Department of Agriculture WA

Administering Institution The University of Western Australia

Project Summary

Australian grain producers face increasing competition on the world market from countries with cheap production costs (China, Argentina, Brazil). This project will develop biological farming systems based on improving soil health and enhancing soil microflora and nutrient cycling. Western Australia and other states are currently defining certification guidelines for sustainable farming systems (including biological ones). Selling grain produced in certified biological farming system will attract market premium, therefore enhancing the position of Australian farmers. This project will produce fertiliser recommendation systems incorporating organic fertilisers, thus decreasing costs of production and maintaining clean and healthy environment.

Summary of Linkage Projects Applications for Funding to Commence in 2006

LP0669766 Dr M Ryan; Prof R Appels; Dr P Nichols; Mr R Snowball

Approved Project Title **Molecular approaches for the exploitation of genetic diversity in subterranean clover (*Trifolium subterraneum* L.) for profitable Australian farming systems**

2006 : \$45,000
2007 : \$99,500
2008 : \$118,500
2009 : \$64,000

Primary RFCD 3002 CROP AND PASTURE PRODUCTION

Partner Organisation(s)

Department of Agriculture Western Australia

Administering Institution The University of Western Australia

Project Summary

Subterranean clover is the most widely sown annual pasture legume species in southern Australia. It is native to the Mediterranean basin and has been sown over an estimated area of 22 million ha. This project will provide breeders with a focused core germplasm collection representing the range of genetic diversity of the around 8000 accessions in the original collection. The focused core collection will lead to more efficient and effective breeding of elite cultivars for sustainable and profitable farming systems to benefit wool, meat and grains industries.

LP0669515 Prof K Siddique; Dr M Tibbett; Dr C Revell; Dr MD Bolland

Approved Project Title **Phosphorus - A Key Factor in the Development of Novel Perennial Herbaceous Deep-rooted Pasture Legumes**

2006 : \$36,500
2007 : \$73,000
2008 : \$83,000
2009 : \$46,500

Primary RFCD 3002 CROP AND PASTURE PRODUCTION

Partner Organisation(s)

Department of Agriculture, Western Australia

Department of Agriculture, Western Australia

Chemistry Centre of Western Australia

Heritage Seeds

Facey Group

Mingenew-Irwin Group

Administering Institution The University of Western Australia

Project Summary

This research aims at the development of urgently needed perennial pasture legumes, to expand perennial pasture options for southern Australia beyond lucerne. The development of new deep-rooted perennial pasture legumes has enormous potential to improve nutrient and water use over large areas of agricultural land. Benefits in terms of reducing soil erosion and acidification are also likely. An understanding of the responses of new perennial legumes to soil phosphorus is a prerequisite for the development of new perennial farming systems. Overall, both environmental and financial benefits will accrue at scales ranging from individual farmers and rural industries through to the general community.