Australian Government

Rural Industries Research and Development Corporation

RIRDC Completed Projects in 2008 - 2009 and Research in Progress as at June 2009

RIRDC Publication No. 09/106

FODDER CROPS

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Foreword

RIRDC produces Research in Progress summaries of continuing projects and those completed during 2008-2009. Our intention is to:

- give stakeholders early access to the results of ongoing and completed work to inform their decisions, and

- inform researchers of results to shape research directions.

The complete report on all programs is on our website at http://www.rirdc.gov.au

Fodder Crops Research in Progress June 2009, contains short summaries of continuing projects as well as those that were completed during 2008–2009. The Fodder Crops program aims to stimulate and promote those R&D efforts that will produce quality fodder products and secure sustainability and profitability for all sectors of the Australian fodder industry value chain in domestic and export markets.

There are seven sub-program objectives. These are:

- Markets, products and 'Blue Sky' Research
- Plant Breeding and Germplasm Evaluation
- Crop Agronomy and Fodder Production Efficiency
- Supply Chain Efficiency Harvesting, Transport, Traceability and Relationships with Allied Industries
- Improved Fodder Quality
- Climate Change, Biosecurity and Environmental Management
- Industry Linkages, Communication, Information Flows, Forecasting Tools and Program Evaluation

This report is an addition to RIRDC's diverse range of over 1900 research publications, which are available for viewing, downloading or purchasing online through our website: www.rirdc.gov.au. Purchases can also be made by phoning 1300 634 313.

Peter O'Brien
Managing Director
Rural Industries Research and Development Corporation

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Crop agronomy - nutrition, disease, weed, pest & micro-organism management

Project Title	Fungicides for managing diseases and quality in export oaten hay
RIRDC Project No.:	PRJ-000636
Start Date:	4/1/2007
Finish Date:	6/30/2009
Researcher:	Patrick Redden
Organisation:	Rural Directions Pty Ltd
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Objectives	The objectives of this research are to improve the quality colour and yield of export oaten hay by: -Evaluating the effectiveness of a range of registered and non-registered fungicides on controlling septoria stem and leaf rust and/or bacterial leaf blight in oaten hay - Determining whether control of leaf diseases leads to improvements in visual and chemical hay quality and hay yield and - Calculating the cost effectiveness of fungicide use including as a precautionary application.
Background	The export hay market is highly competitive and Australia competes with numerous other exporters for market share. It is a quality driven market. For Australian growers to continue to remain a preferred supplier will require produce that meets premium standards and expectations. Leaf diseases can result in a serious reduction in the quality of hay. A reduced incidence of leaf disease will improve the quality of export oaten hay by preserving green leaf area, an important component of visual quality. It will also reduce necrotic leaf tissue in the hay which tends to have poor feed value.
Research	Small plot field trials were established in Western Australia and South Australia to investigate the impact of fungicides in controlling leaf diseases in oaten hay, and whether there is a quality or yield improvement that results in economic benefit. A range of varieties were also assessed with and without fungicide to investigate variety responses to fungicide application.
Outcomes	Foliar fungicides Tilt®, Opus®, Tilt Xtra®, and Amistar Xtra® demonstrated good levels of activity on septoria blotch in the Western Australian trials. Other fungicides to show some degree of septoria control, although less consistently were Folicur®, Impact®, and Bravo®. Also evident in the Western Australian trials was the impact of timing of application on disease control. Ensuring that the product is effective during the disease development phase is critical to ensuring good control. Disease control in the South Australian trials was not as effective, and no fungicides provided adequate control of red leather leaf and bacterial blight. Suppression was observed where disease severity was slightly reduced for some products however. Products of interest were Tilt®, Tilt Xtra®, Prosaro®, and Amistar Xtra®. Disease control from two applications of Tilt was evident across a range of varieties and breeders lines in the Western Australian variety response trial. The greatest responses were observed in varieties with MR resistance status to septoria. Some hay quality improvements were recorded as a result of the disease control

	from chemical fungicides. Hay colour, which determines the visual quality, was improved with septoria control in the Western Australian trials in 2008. This was achieved with a late application of Tilt®. Opus® also had an impact on colour but not to the same extent as the late application of Tilt®. No economic improvement from fungicide application was statistically significant over any of the trials.
Implications	Recommendations from this project are: • The hay industry and chemical companies can now prioritise actions for withholding period and residue testing of those fungicides shown to have the most potential for septoria control. • Further research is required to assess fungicide performance under high disease pressure. To offset the impact of seasonal variation trials of this nature should be run over a minimum of three years rather than two. • Seed dressings appear to be of little benefit in controlling the target leaf diseases in oats, and should not be included in future research. • Future research should also encompass flexible treatment timings. • The research has also demonstrated the importance of maintaining disease resistance as a priority in breeding problems. • A continued focus on educating growers and advisers about leaf disease identification and management is required to maximise quality of oaten hay.
Publications	Nil

Improved fodder quality

Project Title	Adoption of the AFIA ChemCheck system by the export fodder industry
RIRDC Project No.:	PRJ-002287
Start Date:	8/7/2008
Finish Date:	3/19/2012
Researcher:	John Black
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Objectives	1. Facilitate uptake of the AFIA ChemCheck prototype developed in project PRJ-000642 by the hay export industry and associated growers. 2. Modify the AFIA ChemCheck prototype where identified to better serve the needs of the fodder industry
Background	Total shipments of hay and straw from Australia to the year ending June 2006 were 650,000 tonnes - worth approximately $206 million. A Japanese Ordinance proclaimed in May 2006 allowed action against importers of animal feeds, including hay and straw, if a violation was detected in Maximum Residue Limits (MRL) values for 60 chemicals. If residues for any one of the listed compounds in a shipment of Australian fodder exceed its MRL, the rate of monitoring will be increased dramatically. A further breach is likely to result in severe impediment to ongoing shipments. A previous project (PRJ-000642) developed a prototype AFIA ChemCheck system to minimise this risk. This project was established to enhance the pesticide and fertiliser products database and facilitate adoption of the system across the whole hay export industry.
Research	Project activities comprised; (i) updating and completing the chemical products and fertiliser database and software for the AFIA ChemCheck system and (ii) training personnel from the hay exporting companies and their growers to use the system. The database was updated by reviewing the information on the labels for every herbicide, fungicide, insecticide, miticide and adjuvant product registered by APVMA for application to oats, wheat, barley, triticale and rye. The database is being extended to cover millet, lupin, lucerne, pasture, canola, vetch and Rhodes grass. Information came from the APVMA database and directly from pesticide and fertiliser manufacturing companies. Changes to the software were made following discussions with users and from testing the program. Training personnel from the hay export companies and their growers was through face-to-face contact and by telephone.
Outcomes	A commitment was obtained from fodder exporting companies to adopt the system and fund its operation for 5 years. Close to 100% of growers providing hay and straw for export will be registered in the system by the 2009 harvest. The products database has been expanded from 1000 products in the prototype to 2,238 by July 2009. Approximately 30 new products are added each month. The system is being extended to the domestic Fodder Care Program and is being investigated by other rural industries to improve compliance with pesticide use.
Implications	Adoption of the AFIA ChemCheck system by the hay export industry and its likely adoption across a broad range of rural industries in Australia will reduce greatly the risk that commodities will contain pesticides at concentrations above their MRL values. Such an assurance of high purity for rural commodities produced in Australia will improve greatly the integrity of food supply and Australia's competitiveness in international markets.
Publications	Nil

Project Title	RIRDC / GRDC Review of the National Oat Breeding Program 2008
RIRDC Project No.:	PRJ-003772
Start Date:	9/22/2008
Finish Date:	3/31/2009
Researcher:	Don Marshall
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Objectives	This consultancy has been established to address concerns regarding the funding and administration of the National Oat Breeding Program administered by SARDI, to identify ways to improve the current funding situation, to identify new options for administrative cooperation between the two funding agencies and to address the duplicative workloads required of the grantees.
Background	RIRDC and GRDC have provided grant funding to SARDI to support the National Oat Breeding Program since its inception. To date, RIRDC funding has been focused towards varieties bred to support the oaten hay industry (primarily for export) and the GRDC funding has focused on breeding varieties for the food and feed markets. However administration of the two grants has been undertaken in isolation leading to duplication in reporting and administrative inefficiencies. In addition the oat industry continues to experience rapid change raising the question of whether the current focus and funding of the program is adequate to meet future needs. The present review was jointly commissioned by RIRDC and GRDC to address the issues of the administration, funding and focus of the National Oat Breeding Program.
Research	The review was undertaken by an independent consultant. He visited the SARDI headquarters of the program in early November, 2008 and was provided with extensive documentation relating to the objectives of the review. In addition, hay exporters and other end users were contacted by telephone or e-mail to understand the oat industries research priorities and future key research areas.
Outcomes	The consultant presented a written report with four specific recommendations and a number of suggestions to improve the funding and administration of the National Oat Breeding Program.
Implications	N/A
Publications	Nil

Industry communication & information flows

Project Title	Gap analysis and implementation program for research in the Aus fodder industry
RIRDC Project No.:	PRJ-002286
Start Date:	6/27/2008
Finish Date:	6/30/2009
Researcher:	John Black
Organisation:	John L Black Consulting
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Objectives	To survey current and proposed fodder research in Australia, identify the gaps in fodder research activities and capacity and undertake a program that will facilitate industry understanding and support for research activities.
Background	The Australian fodder industry comprising conserved hay, straw and silage has an annual value of approximately $2 billion and is expected to grow by a further 20% by 2013. Even with an almost doubling in fodder production over the last decade, demand has exceeded supply to the extent that little fodder now remains in store prior to the next harvest. Despite the rapid expansion of the fodder industry, its strong international position in export markets and increase in demand, investment in fodder Research, Development and Extension (RD&E) in Australia is extremely low compared with other major agricultural industries. Investment by RIRDC in fodder RD&E is approximately 0.045% of the gross value of the product compared with around 1% for other major rural industries. Unlike other industries, there is no compulsory levy for fodder research. Investment in fodder RD&E is not centralised and includes funds from several rural R&D organisations, state and commonwealth authorities and industry. The primary purpose of this project was to identify current projects and expenditure on fodder RD&E relative to the projected needs for research so the information can be used by the Australian Fodder Industry Association to make a case to the Federal Government for a compulsory levy for fodder RD&E.
Research	Fodder RD&E was separated into fodder-specific projects, which were directly related to the conservation of pastures or crops, and fodder non-specific projects, which were related to general agronomy, plant breeding or management systems, that may have a spin-off value for the fodder industry. Information on projects related to fodder, funding source and RD&E capacity was obtained through web-based searches and direct contact with individual scientists, organisations and fodder industry representatives via a survey with follow-up discussions and emails. A description was written for each identified project or publication. Little attempt was made to identify research conducted by agribusiness, particularly where it related to individual company products.
Outcomes	Direct investment into fodder-specific research in 2007 from all sources was just under $900,000. Investment for fodder RD&E was from a diverse group of organisations including RIRDC, Dairy Australia, hay exporting companies, seed companies and state governments. The areas for investment are not well coordinated and duplication exists. The direct investment attracts in-kind investment from research provider organisations in a ratio of approximately 40 direct to 60 in kind. However, the research organisations are explicit in stating that their in-kind investment depends on receiving direct investment from outside sources. Future ongoing direct investment in fodder-specific research is tenuous. It is estimated to be as low as $600,000 annually. Of this, $400,000 through RIRDC and the hay export industry cannot be guaranteed.

	The minimal research needed by the fodder industry to meet its future needs is estimated to require direct investment of at least $4.5 million annually. This investment represents only 0.23% of the value of the industry and is likely to attract in-kind investment from research providing organisations of around $6.5 million. Four fodder projects recently undertaken by RIRDC have been independently assessed to show an internal rate of return on investment ranging from 22 to 484%.
Implications	A levy equivalent to 32 cents per tonne of fodder applied across Australia in a typical production year and matched by Federal Government funds would raise $4.5 million annually. A levy of 50 cents per tonne, with matching Government funds, would raise $7 million annually and provide a greater opportunity to improve efficiency and competitiveness of the Australian fodder industry. $1.00 per tonne represents 0.35% of the value of the industry and this is still well below the 1% investment made by other major rural industries. A 50 cents per tonne levy is recommended. A 50 cent per tonne levy would cost the average dairy farmer with a 250 cow herd $250 per year. This amount would be recouped by the farmer if, for example, wastage of fodder costing $250 per tonne was reduced by just 0.2%. A more likely reduction in wastage resulting from appropriately targeted research and extension is 5%, which would save $25 per tonne.
Publications	Inquiry into Government drought support: submission to the Productivity Commission by AFIA 2008.

Plant breeding & germplasm evaluation

Project Title	Development of improved oat varieties for hay production: National program IV
RIRDC Project No.:	PRJ-002298
Start Date:	9/30/2008
Finish Date:	6/30/2009
Researcher:	Pamela Zwer
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Objectives	As part of the National oat Breeding Program improve oat varieties for export and domestic hay production. The national scope of the program will ensure oat hay varieties are adapted to the southern region of Australia. Industry interaction in the breeding program is essential for identifying breeding priorities for hay variety development.
Background	Oat hay is a significant proportion of both export and domestic markets with significant growth particularly in the export sector. The export oat hay industry has grown from about 100,000 t in 1993 to over 700,000 t in 2005/06. In 1993 there were two main varieties, Marloo and Wallaroo, in South Australia where the majority of export hay was produced. At that time only SARDI was breeding oat hay varieties. Western Australia focused on milling and feed oat varieties, so growers had to experiment using grain varieties for hay production. Today Western Australia and South Australia produce a significant proportion of export hay. As the industry grows it is essential that a consistent supply of high quality oat hay can be sourced for their markets.
Research	Data collected for hay and grain yield, hay and grain quality, disease resistance, and agronomic traits were summarised and advanced breeding lines promoted to stage 2, stage 3, stage 4, and stage 5 hay trials.
Outcomes	Lines for 2009 hay trials were selected, trials designed, seed prepared, and trials sown. The advanced breeding line SV96025-7 was named Mulgara and 16 t of seed was produced in 2008. Approximately 2.5 t of Tungoo was produced in 2008.
Implications	Breeding for improved hay varieties will continue for the 2009/10 growing season.
Publications	Nil

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