

# Farming Systems South

## – Winter 2011

### INTRODUCTION

The Farming Systems (South) Unit (FSS) undertakes research to give farmers management options that will improve productivity and protect the natural resource base of the mixed farming enterprises of southern NSW west of the Great Dividing Range where winter crops and pastures predominate. Major issues in this region include; a decline in productivity of cropping; soils that are low in nutrients and soil carbon; soil acidity, salinity and sodicity; the need to manage soil moisture reserves; reducing feed gaps for animals; weed resistance to herbicides and chemicals; the increasing cost of inputs and a trend to larger farms, fewer farmers and corporate farming. Options to improve productivity are provided through a range of approaches; including agronomic research, feedbase management research, plant breeding and genetics research, and crop quality research. Economic research assesses the viability of options.

### RESEARCH CAPABILITIES

- » 25 research officers supported by 54 highly skilled technical staff mostly located Wagga Wagga Agricultural Institute with others at Yanco Agricultural Institute, Elizabeth Macarthur Agricultural Institute, Condobolin ARAS, Cowra ARAS and Cootamundra.
- » Key facilities include glasshouses and growth rooms, cereal, oil, feed and molecular science laboratories, an animal house for livestock feeding studies and expert pathology, entomology, and biometry and economic research support, enhanced through alliances (EH Graham Centre for Agricultural Innovation, NSW Agricultural Genomics Centre, Pulse Breeding Australia) and research collaborations with Farming Groups, universities and CRC.
- » Our researchers work closely with extension colleagues and primary producers to ensure our work is relevant, is addressing high priorities and is adopted quickly.

### CONTACT US

For more information on our full portfolio please contact John Oliver (02) 6938 1816 or [john.oliver@industry.nsw.gov.au](mailto:john.oliver@industry.nsw.gov.au)

### SELECTED PROJECT UPDATES

#### IMPROVING PRODUCTIVITY WITH VARIETY SPECIFIC AGRONOMY PACKAGES (2009–2012)

**INTRODUCTION:** Grain varieties differ in their responses to agronomic practices such as sowing time, row spacing, seeding rate, stubble and nutrition. Up to-date information on the responses of new varieties to agronomy can help farmers improve productivity.

**FINDINGS:** Responses to row spacing, stubble and seeding rate have differed between the wet and dry seasons recently experienced. Wide row spacing reduces yield in high yielding wet seasons and had minimal or no effect in lower yielding dry seasons. Retaining stubble increased yield in a dry season and reduced yield in wet a season. Varieties responses to sowing time are complex and have been published in an NSW DPI Primefact.



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**PARTNERS:** Grains Research  
and Development Corporation  
(GRDC)

#### IMPROVED FEEDBASE PRODUCTIVITY WITH PERENNIAL GRASS CULTIVARS (2009–2011)

**INTRODUCTION:** Annual legumes have formed the basis of pasture systems in southern NSW but lack persistence. Incorporation of perennial grasses assists with soil water management and feedbase supply and a perennial based pasture system in rotation with cropping can substantially increase profit and increase farm viability in low rainfall years. We are identifying new cultivars bred for increased persistence and production in environments currently considered marginal for sown temperate grasses.

**FINDINGS:** Cultivars of phalaris, cocksfoot and fescue with improved persistence and production have been identified. The best for the medium to high rainfall zone will be selected for release following evaluations of regional adaptation.

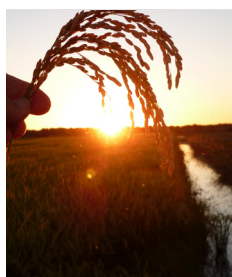
**CONTACT:** Dr Guangdi Li, Wagga Wagga (02) 6938 1930

**PARTNERS:** Future Farm Ind CRC, CSIRO, DPI Victoria, MLA

## IMPROVING WATER PRODUCTIVITY WITH BETTER RICE VARIETIES (2010–2015)

**INTRODUCTION:** Greater tolerance to cold is the most effective way to generate stable rice yields. The recently released rice variety, Sherpa, is a result of increased effort in screening for cold tolerance at early generations – using purpose-built screening infrastructure at Rice Research Australia Pty Ltd coupled with early and late-sowing to capture naturally-occurring cold events.

**FINDINGS:** Sherpa can withstand lower temperatures at microspore, with a 2°C lower threshold for cold damage. It has shorter growth duration (10-14 days earlier to flower than Amaro) than current varieties while maintaining high yields - thereby increasing water productivity.



**CONTACT:** Dr Russell Reinke, Yanco (02) 6951 2516; Dr Peter Snell, Yanco (02) 6951 2742

**PARTNERS:** Rural Industries RDC; Rice Research Australia Pty Ltd; SunRice

## IMPROVING FEEDBASE PRODUCTIVITY BY ALLEY FARMING WITH OLD MAN SALTBUSH (2008-2013)

**INTRODUCTION:** Planting woody perennials such as old man saltbush into an existing, mixed farming system has the potential to improve the reliability of forage supply in low rainfall environments. It also has the potential to re-establish water use patterns similar to those of the original landscape.

**FINDINGS:** Biodiversity is better under the alley farming system than under the commercial best practice system. The saltbush belts successfully create a dry buffer of soil that helps minimise deep drainage. However, production and economic benefits to the farmer are not yet clear cut from this ongoing research. The biggest hurdle is the cost of lost production from the prime farming land planted to saltbush. Saltbush plantings must overcome this opportunity cost before they become competitive with current best practice systems.



**CONTACT:** Richard MacCallum, Condobolin, (02) 6895 1002

**PARTNERS:** Grain & Graze

## IMPROVING PRODUCTIVITY BY MAINTAINING YIELD AND QUALITY IN ADVERSE CLIMATE CONDITIONS (2006–2011)

**INTRODUCTION:** Drought stress not only reduces grain yields but usually occurs in combination with heat stress and this affects the quality of the harvested grains. Through the NSW Agricultural Genomics Centre we have been identifying genetic mechanisms to assist development of improved wheat varieties that will maintain productivity in dry seasons.

**FINDINGS:** The Centre has identified a number of genetic alleles associating the effects of temperature and water stress on wheat quality. Interestingly these genetic influences do not associate with the standard tests used to predict baking performance. Evidence has also been obtained on the influence of temperature on flowering that raises the prospect of developing lines that could assist adaptation to climate change. A number of populations have been established to investigate the physiology and genetics of rapid grain filling as a means to improve water productivity.



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**PARTNERS:** CSIRO; Australian Centre for Plant Functional Genomics; BioFirst

## IMPROVING PRODUCTIVITY THROUGH BETTER PULSE VARIETIES (2011–2015)

**INTRODUCTION:** In partnership with Pulse Breeding Australia, we provide support to various breeding programs. Linked to this is agronomic research investigating sowing time to match biological development stages of different varieties across the range of southern NSW environments; seeding rates to optimise plant density; row spacing to optimise plant arrangements of different plant architectures and harvest efficiency (desiccation, early harvest) to optimise yield & quality.

**FINDINGS:** Recent pulse releases into southern NSW include Gunyah and Twilight field peas; Jenabillup lupin; Hat-Trick and Slasher chickpeas. Two field peas suited to NSW are under consideration for a late 2011 release.



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**PARTNERS:** Pulse Breeding Australia

# PIS&R PROJECT UPDATES