

the Innovator

The Newsletter from the EH Graham Centre for Agricultural Innovation

CHARLES STURT
UNIVERSITY



Industry &
Investment

SUMMER 2011 EDITION

Happy New Year and welcome to the Summer Edition of the Innovator.

What an end to 2010!

The season started with such promise, but ended in disaster with the floods and finally the locusts. This is the nature of agriculture, and our growers' resilience will again deal with the challenges.

Our research must continue to help with adaptation to climate change and the other uncertainties facing agriculture. The Graham Centre is currently undertaking a review and planning process for the next five years. Our refined focus and strategic direction will be decided in early 2011. We will ensure that we improve our industry links in the mixed farming systems areas and sharpen our focus on key, achievable outcomes.

Our research on sustainable agricultural production in Australia and overseas becomes critically important with the need to both drought-proof and flood-proof our farming systems. An upside of the current situation is that food security in Australia and South East-Asia is now back on the political agenda. There is concern about food riots in some countries, and the impacts of the current weather disasters on the opportunities for Australia to provide food and fibre for both domestic and international needs. We

will only achieve the necessary productivity gains with increased and on-going State and Federal Government support for our R&D.

Our recent workshop on Ethics in Agriculture has commenced a research collaboration with the applied philosophers at CSU and other institutions, to address some of the ethical issues facing Australian agricultural production systems, including animal welfare, production versus sustainability, competing demands for water, and our role in international agricultural R&D (especially in Asia). See page 4.

Members have attended a number of important national and international conferences this year, and details of their research papers are in this Issue.

I look forward to working with you in 2011 to increase the relevance of our research for increased productivity and environment protection.

Professor Deirdre Lemerle
Director

News

2010 CAWS Medallist

Professor Jim Pratley

Professor Jim Pratley, Professor of Agriculture at Charles Sturt University, has recently been honoured with the award of the prestigious CAWS Medal for Leadership in recognition of his distinguished career in weed management. The Council of Australasian Weed Societies (CAWS) confers this medal in peer recognition of sustained and nationally influential contributions in the fields of weed management research, teaching, administration and extension.

Jim's research career commenced with a doctorate through the University of New South Wales investigating plant and soil impact on livestock selenium nutrition. Further research during his career has focused on long-term studies on tillage systems, herbicide resistance and allelopathy of crops and weeds. The first worldwide occurrence of glyphosate resistance was reported by a research team led by Jim.

His career in academia at Wagga Wagga commenced in 1972 as a lecturer in plant science at the then Wagga Agricultural College. With the formation of Charles Sturt University in 1989, Jim became the foundation Dean of Science and Agriculture, a position he held for 16 years. Around 70% of the current agronomists in southern and central NSW would have been taught by Jim as CSU undergraduates.

Four books, 20 book chapters and over 60 refereed journal papers are testament to the productivity of his career in research and teaching.

In 2008, Jim received the Molisch Award from the International Allelopathy Society in recognition of continued excellence in the field of allelopathy research.



Professor Jim Pratley is presented with the CAWS Medal for Leadership by Dr Rex Stanton, President of the NSW Weeds Society in Sydney, December 2010.

THIS ISSUE

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- ◆ [I&I NSW website](#)

Jim has contributed extensively to weed management administration and extension through service on the boards of several Cooperative Research Centres, chairing national and international conference committees, and he continues to serve on government and industry Councils. It is difficult to think of many other people of the current era who have had such an influence on weed management and agriculture in southern Australia over such a long period of time.

Compost Evaluation, Can Tho University, Vietnam

David Gale, Honours Student, CSU Wagga Wagga

The field evaluation of compost for soil phosphorus were undertaken between June and October 2010 and were primarily established to validate results in the field, from work done in a controlled glasshouse environment in Australia, as part of David's honours project. Additionally this was seen as an opportunity to develop research skills in a field environment and relate them to a glasshouse environment, but also to strengthen international connections and develop skills in the establishment and implementation of a project which is based overseas.

Vietnam was chosen because of existing connections held by Graham Centre members, the short growing season for trial crops, and cultural and language diversity within a university where English is still the working language.

By undertaking this Graham Centre funded travel grant, David was able to conduct



David Gale on the day of the final harvest (which shows some treatment differences in crop height and colour, if you look closely).

the second and third phases of his honours research through field evaluation of glasshouse findings. These results suggested that compost may have the capacity to address challenges associated with depleting global phosphorus supplies and, may be part of addressing the need for global food security.

The experiments in Vietnam validated the glasshouse results and found that compost may be part of a long-term solution for supplying the world's phosphorus demands by cycling phosphorus more efficiently instead of relying solely on 'fresh' mined supplies.

This field evaluation was able to take place using a fast growing maize crop in a tropical environment. This meant that results were collected

quickly, which is important for an honours project because of the short length of time within which the whole project must be completed.

Throughout the field trial, David lived and worked in a part of Vietnam where English was spoken by people at the university but not many other places. This meant that he had to learn the culture and try and learn the language – skills which would be helpful with his goal in undertaking projects in association with organisations such as ACIAR in the future.

He also developed networks which will be useful for future collaborative activities between the Graham Centre and Can Tho University on projects such as this one, where maximising profit for farmers is sought through reducing input costs and increasing sustainability.

David Gale's Honours Scholarship was funded by the Grains Research and Development Corporation with top up operating funds from the Graham Centre.

Editor's Note: Congratulations are extended to David on his recent appointment as a Graduate Trainee with Industry & Investment NSW at the Elizabeth Macarthur Agricultural Institute, at Camden near Sydney.

December Board Meeting

The Board of Management met three times in 2010; its role is to oversee the strategic direction and success of the Centre. Board Members from CSU are: Professor Ian Goulter, Vice Chancellor and President, Professor Sue Thomas, Deputy Vice-Chancellor and Vice-President (Research); and from I&I NSW: Dr Richard Sheldrake Director-General, and Ms Renata Brooks, Executive Director Agriculture & Primary Industries Science and Research.

Strategic Planning Day

Centre members met with RMCG Consultants, Nigel McGuckian and Dr Anne-Maree Boland on 10 December 2010 as part of the consultation process in the development of our Strategic Plan for 2011-2016.

The day was very successful and the feedback from participants will be most useful to the consultants in developing the Plan. It is clear that we need to increase research focus and strengthen our industry links, as well as build on our research capacity.

The new Strategic and Operational Plans for the Centre will be finalised by February 2011.



Assoc. Professor Andrea Bishop (representing Professor Sue Thomas), Professor Ian Goulter and Professor Deirdre Lemerle enjoy a chat after the December Board of Management meeting in Wagga Wagga.

Ethics in Agriculture Workshop

The production and delivery of 'clean green' food is a complex process underpinned by scientific and technological, social, political and ethical inputs. For example, water provides for both food production and environmental protection such as biodiversity, but how do we optimise the benefits to these competing needs? People want meat at affordable prices, but what is the cost to animal welfare? Such dilemmas will become critical as the challenges of food security, climate change and water scarcity, population growth, decreasing land availability, and a skills shortage further pressure agriculture. We must address some of these ethical issues to inform future policy and practice.



From left, Prof Michiel Korthals[†] (workshop facilitator) with organising committee, Dr Emma Rush, Prof John Weckert and Prof Deirdre Lemerle. Photo: Virginia Gawler.

A workshop was organised by Professor Deirdre Lemerle together with Dr Emma Rush and Professor John Weckert, School of Humanities & Social Sciences, at CSU Wagga Wagga on 30 November and 1 December, 2010, to commence a discussion on Agricultural Ethics. A select group of around 20 agricultural scientists and applied philosophers attended to develop a multi-disciplinary team addressing issues around agricultural ethics. This activity was a collaboration between the Graham Centre and the Centre for Applied Philosophy and Public Ethics (CAPPE), a partnership between CSU and the University of Melbourne. Sustainable food production and environmental protection is a core requirement for the future of Australia's economic, environmental and social growth.

Professor Michiel Korthals[†] from Wageningen University, The Netherlands, gave the opening address and facilitated discussion. The outcomes were the formation of a team of scientists, ethicists and applied philosophers to address the issues; we identified the current situation and information gaps (research needs were identified); and we commenced the development of a research proposal and identified potential funding sources.

[†]Michiel Korthals is Professor of Applied Philosophy at Wageningen University, The Netherlands. He studied Philosophy, Sociology, German and Anthropology at the University of Amsterdam and the Karl Ruprecht Universität in Heidelberg. His academic interests include bioethics and ethical problems concerning food production and environmental issues, deliberative theories, and American Pragmatism.

Science Education Officer

The Graham Centre welcomes **Emma Wordsworth** to the team. Emma has recently been appointed as Science Education Officer in a partnership between Charles Sturt University and the Primary Industry Centre for Science Education (PICSE).

PICSE is a national strategy of collaboration between universities, their regional communities and local primary industries, to attract students into tertiary science and to increase the number of skilled professionals in agribusiness and research institutions. The primary industries targeted by PICSE are those which focus on the sciences of agriculture, aquaculture, ecology, horticulture, fisheries, water security, sustainability, climate change and the environment.

PICSE has activity centres at universities around Australia with CSU being the most recent addition. Activities coordinated by the activity centre include:

- Science Investigation Awards
- Industry Science Camps
- Professional development for teachers in practical industry settings
- Industry placement for Year 11 and 12 science students
- Development of curriculum based science resources

For more information contact Emma Wordsworth: T: (02) 6938 1832;
E: ewordsworth@csu.edu.au; W: www.picse.net



The Graham Centre welcomes Science Education Officer, Ms Emma Wordsworth.

Research Updates

Potential for Spelt Wheat

Robyn Neeson, Organic Farming Liaison Officer, I&I NSW, Yanco

(Extract from the Final Report prepared late 2010 for the Research Industries Research and Development Corporation)

Researchers: Ms Robyn Neeson, Dr David Lockett and Dr Jeffrey Evans

In Australia spelt is principally grown in traditional wheat growing areas; however there are indications that its adaptability may extend into cooler and wetter areas.

There are a number of processors of spelt products in Australia; these include larger manufacturers of bread products, but also a number smaller manufacturers of specialty spelt products such as organic flour, pasta and cereals.



Project Leader, Robyn Neeson, inspecting spelt screening and seed increase trials, Yanco Organic Research Site.

Results/Key Findings

- The results presented in this report are from two year's evaluations and therefore should be cautiously interpreted.
- The spelt genotypes we evaluated exhibited a wide variation in agronomic and quality attributes. Spelt wheats were lower yielding, later maturing, generally produced more biomass and tillering, lower grain harvest index, and had lower P efficiency for grain production, than common bread wheat cultivars.
- Our research has identified two 'true' spelt genotypes (ST1040 and ST1041) as potential replacements for the industry standard 'Kamarah'. A third genotype (ST1019), most likely a spelt-wheat hybrid, is free-threshing and could be considered for the conventional market-place. Optimum performance was achieved by sowing these genotypes in May through to mid June, although earlier sowing may also prove successful.
- Where Kamarah was included in the phosphorus field experiments, its grain yield was < 55% of Wedgetail wheat. In genotype evaluations the yield of Kamarah was 52% of Wedgetail's yield and 36% of the yield of Livingston. These results support the anecdotal evidence that current commercial crops of spelt yield less than commercially-grown bread wheat. A wide range of alternative spelt genotypes used in this study also yielded significantly less than standard bread wheats.
- Kamut[®], (*T. turgidum* subsp. *Turanicum*), was also evaluated. Kamut[®] is the brand name of a privately held company, also known as 'Khorasan', 'Faro' or 'Pharaoh' wheat. In this project Kamut[®] exhibited similar features to lower yielding spelt genotypes. Similar variability exists amongst genotypes of this sub-species. It is understood that private research is currently being undertaken to assess and improve the yield and quality attributes of this sub-species.
- DNA (DARt) analysis indicated that some spelt genotypes are spelt/wheat hybrids.
- The spelt genotypes exhibited a wide variation in genetic and agronomic attributes. A range of disease (stripe and stem rust) and aluminium tolerances were also identified.
- Results of the phosphorus uptake trials revealed that spelt genotypes were more efficient in converting internal P into biomass, but were less efficient in converting applied P or internal P into grain yield.
- The spelt genotypes achieved (on average) 16.7% grain protein compared to 15.7% for wheat. Several spelt genotypes were found to have comparable or better flour extraction rates than wheat.

Rural Air Particles Project

Lauren Bartosh, Air Quality and Program Officer

Wagga Wagga experiences high levels of air pollution in autumn which are thought to be due to smoke and dust. The Rural Particles Project was established in 2009 to address the issue and examine potential causes, a collaboration between the Graham Centre and the Department of Environment, Climate Change and Water (DECCW).



Lack of groundcover causes severe soil erosion with implications for poor human health. Photo: Maree Crowley.

Progress has been made since the Air Quality Workshop was held in April 2010. The Graham Centre and DECCW hosted the workshop, which aimed to identify research gaps and generate awareness in the community.

A panel discussion agreed that there is a need to continue to work together in a collaborative way. Also, we need to better understand the sources of air pollution and subsequent health implications.

As part of the Rural Air Particles project, a literature review has commenced which aims to identify the health impacts from particulate pollution. The research is being jointly conducted by the CSU's Centre for Inland Health and the Population Health unit of the Greater Southern Area Health Service, and is funded by the DECCW and CSU, as part of the Rural Air Particles Project.

Survey of level of herbicide resistance

Eric Koetz, Technical Officer, I&I NSW, and John Broster, Senior Technical Officer, CSU, Wagga Wagga

A herbicide resistance survey of weeds in cereal crops was undertaken in late 2010 to determine current levels of resistance in wild oats and annual ryegrass. It was conducted west of the Newell Highway starting from Forbes in the Central West and concluding along the Murray River in the Far South West of NSW. This survey was conducted over a period of three weeks on 10 – 20 km north south transects. Samples were collected at random every 10 km from cereal paddocks. If no cereal paddocks were present a miss was recorded and the survey moved onto the next 10 km cereal paddock. Paddocks were sampled for annual ryegrass and wild oats and the presence and abundance of other crop weeds was also recorded. One hundred and fifty-eight samples were collected from over 170 paddocks visited. Data from this survey will form a benchmark for herbicide resistance in this part of the cropping zone as a reference for future surveys.

All samples were placed in the glasshouse to dry and will be cleaned and processed prior to herbicide screening in June 2011. Annual ryegrass samples will be screened against Hoegrass, Select, Sertin (Hoegrass resist only), Glean, Intervix, Simazine, Trifluralin and Roundup. Wild oats will be screened against Hoegrass, Select, Avadex, and Mataven.

This research is funded by the Grains Research & Development Corporation.



John Broster sampling a wheat crop for annual ryegrass to be tested for resistance to herbicides. Photo: Eric Koetz.

Recent Conferences

19th World Congress of Soil Science, Brisbane, August 2010

Dr Jason Condon, Lecturer Soil Science, School of Agricultural & Wine Sciences, CSU, Wagga Wagga

The World Congress is held every four years and was last held in Australia in 1968. The focus of the Congress was “solutions for a changing world” and many plenary talks were aimed at the impacts of climate change, population growth and the decrease in the soil resource owing to urban expansion, land degradation and loss of finite resources.

The Graham Centre sponsored a number of members to attend this conference including Dr Jason Condon, and PhD students, Navneet Brar and David Waters. Dr Condon is also Vice President of the Australian Society of Soil Science Incorporated (ASSSI), the

co-organising society of the Congress.

It is a requirement for all attendees to submit papers for review to the scientific committee of the World Congress of Soil Science. Successful submissions were granted oral or poster status. Below are abstracts of accepted papers from Navneet Brar and David Waters.

Nitrogen management in wheat sown in rice straw as mulch in North West India

Navneet Kaur Brar, Jason Condon, Jeffrey Evans and Yadvinder Singh

Abstract

Burning of rice straw after rice harvest in the Rice Wheat System of North West India can be overcome by sowing wheat into rice straw with the help of a machine called the 'Happy Seeder'. The adoption of zero tillage and retaining rice straw on the soil surface alters the nitrogen demand of the wheat crop due to changes in soil temperature and soil moisture under rice straw mulch, which in turn affects microbial growth. The microbes can either immobilise nitrogen or mineralise it and thus affects the plant growth. A field experiment was conducted to optimise the management of N fertilizer for wheat production under rice straw mulch so as to ensure high grain yield, high N use efficiency. Whilst band placement of nitrogen fertiliser at 180 kg/ha resulted in higher grain yield when rice straw was burnt, banding was not effective in increasing yield when straw was retained. The retention of rice straw as a mulch also resulted in higher mineral N concentrations remaining in the soil after harvest which may be used by subsequent crops to minimise leaching. This work provides evidence that retention of rice straw is not detrimental to yield if N management is optimised.

Biochar-Ion Interactions: An investigation of biochar charge and its effect on ion retention

David Waters, Jason Condon, Lukas Van Zwieten and Sergio Moroni

Abstract

The method of measuring exchangeable cations as an approximation for cation exchange capacity was examined using a cow manure and green waste biochar. Both biochars were pre-treated by shaking with water over a range of times. Leachates were analysed, and the pre-treated biochars were then treated with two solutions (0.1M BaCl₂ or 0.1M CsCl) to measure ion adsorption. Pre-treatment shaking had a significant effect on ion adsorption for both biochars. Ion adsorption for the green waste biochar was significantly increased with pre-treatment shaking, whereas it decreased for the cow manure biochar. Compulsive exchange of cations to determine the ability of a substrate to retain positively charged ions on its surface may not be an appropriate method for biochar.



Photo above shows the large contingent of Australian Scientists that attended the 19th World Congress of Soil Science. Photo: Richard MacEwan, DPI Vic (Facebook).

17th Australasian Weeds Conference, Christchurch, New Zealand, September 2010

John Broster, Senior Technical Officer, CSU, Wagga Wagga

The central theme of the conference was the "New frontiers in New Zealand; Together we can beat the weeds". John Broster presented a paper in a concurrent session titled 'A survey of southern New South Wales to determine the level of herbicide resistance in brome grass and barley grass populations'. The paper was part of two sessions dedicated to herbicide resistance at the conference. He was also the co-author of another paper presented at the conference.

This was the first time the conference was held out of Australia as it was previously the Australian Weeds Conference. While the delegates were in the main from Australia and New Zealand, many other countries were also represented. Keynote speakers from the United States, United Kingdom and New Zealand also attended the conference.

Presentations were given on a wide range of topics. The session themes ranged from the ecosystem of interest, for example:



Conference participants examined 'garden escapes' invading the seashore south of Christchurch during the conference field tour of environmental weeds. Photo: Deirdre Lemerle.

aquatic, forests, environmental or crops, through to sessions on specific weeds such as Chilean Needle Grass or Parthenium weed. Other sessions were dedicated to control methods including; biosecurity, biocontrol, allelopathy and eradication and there were two sessions on herbicide resistance.

Papers from the conference are published both in book form and online (http://www.caws.org.au/awc_contents.php?yr=2010) and have a wide readership in the field.

15th Australian Society for Agronomy Conference, Christchurch, New Zealand, November 2010

Richard Hayes, Research Agronomist, I&I NSW, Wagga Wagga

The 15th Australian Agronomy Conference was held at Lincoln University in Christchurch, NZ. It was run in conjunction with annual conferences

of the New Zealand Agronomy Society, the New Zealand Soil Science Society and the New Zealand Grassland Association. Richard Hayes, Deb Slinger, Guangdi Li, Simon Speirs, Ted Wolfe, Jim Virgona, Mark Norton, Len Wade and Deirdre Lemerle were the Graham Centre members in attendance at the conference at which over 250 scientific papers were presented to in excess of 500 delegates. Graham Centre members had a strong presence at the conference, presenting a total of 15 papers.

A very fulfilling conference was concluded by the presentation of the prestigious Donald Medal – an award offered by the Australian Society of Agronomy at each national conference for a person who has made a lifetime contribution to Australian agronomy research. This year it was awarded to Professor Peter Cornish from the University of Western Sydney for his outstanding contribution over many years in the area of phosphorus research. Many locals would remember Peter who worked as a Research Officer, at the Wagga Wagga Agricultural Institute (known then as the Agricultural Research Institute) between 1979 and 1986.

Some of our Papers

1. Dear B, Peoples M, Hayes R, Swan A, Morris, S (2010). Estimated symbiotic N₂ fixation by annual legume and lucerne pastures on 2 Vertosols with and without applied gypsum. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/pastures-forage/lucerne/6905_dearbs.htm
2. Dear B, Li G, Casburn G, Reynolds M, Bathgate A, Robertson M, Llewellyn R, Hayes R (2010) Impact of including lucerne and other perennials in crop-livestock enterprises in southern NSW. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/pastures-forage/lucerne/6905_dearbs.htm
3. Hayes R, Conyers M, Poile G, Oates A, Li G (2010). Spatial and temporal variability in organic carbon observed in soil under lucerne pastures. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/crop-production/high-rainfall-zone/7056_hayescr.htm
4. Hayes R, Dear B, Li G, Virgona J, Conyers M, Hackney B (2010). Phalaris and cocksfoot prove superior to tall fescue in two drought prone environments of southern NSW. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/pastures-forage/dryland-perennials/7051_hayescr.htm
5. Hayes R, Li G, Dear B, Conyers M, Virgona J (2010). Phalaris and lime – improving productivity on an acidic soil in a drought-prone 'high-rainfall' environment. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November,



Delegates took advantage of the quality tours offered during the conference. Photo: Ted Wolfe.

Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/crop-production/subsoil/7053_hayescr.htm

6. Li G, Dear B, Casburn G, Walker J, Bowden P, Hayes R (2010). A survey of the current and future use of lucerne, chicory and perennial grasses in pasture-crop rotations in southern New South Wales. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/climate-change/future-farming/6952_lig.htm
7. Newell M, Larkin P, Hayes R, Norton M (2010) Evaluation of perennial wheat germplasm in an Australian environment. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/crop-production/physiology-breeding/6906_newellmt.htm
8. Peoples M, Swan A, Tidd J, Walker J, Bowden P, Hayes R, Li G, Norton M, Koetz E, Dear B (2010) On-farm participatory research investigating the use of covercropping for the establishment of perennial pastures in mixed farming enterprises. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/farming-systems/participatory-research-extension/7078_peoplesm.htm
9. Slinger D, Hayes R, Bowman A (2010) Opportunities and challenges to increased lucerne adoption in New South Wales, Australia. In "Food Security from Sustainable Agriculture" Proceedings of the 15th Australian Agronomy Conference (Eds H Dove & R. Culvenor), 15-18th November, Lincoln, Christchurch, New Zealand. Australian Society of Agronomy: http://www.regional.org.au/au/asa/2010/pastures-forage/lucerne/7054_slingerda.htm

Dr Jim Virgona, Senior Lecturer, School of Agricultural & Wine Sciences, CSU, Wagga Wagga

The recent 15th Australian Society for Agronomy Conference in New Zealand was an event to remember for many of the participants. Luckily enough the shakey isles were relatively still during the four days of the conference in November. The conference was organised to allow participants to present at least one oral paper each so there were many sessions most of which were well attended. For those interested in the official business of the conference they can get the proceedings from <http://www.regional.org.au/au/asa/2010/index.htm>.

A morning tour was spent explaining the history and features of agricultural systems of the Canterbury plain. This was a great learning experience and despite being thousands of kilometres away in a much colder climate many of the issues there would have been familiar to many of the Australian scientists. Here are some:

1. Irrigation from groundwater plays a major role in the production systems of the Canterbury plain. Apparently over-extraction of the water is becoming a problem.
2. Irrigation is also leading to leaching of soil nutrients so there is work underway to identify which species most effectively utilise soil nitrate.
3. For dryland pastures, species comparisons have shown that lucerne and sub clover are useful.

And then there were the not-so-familiar:

1. How to manage grazing systems around continuous irrigation without making a mess.
2. How to make money when (irrigated) grazing land is selling at \$30,000/ha.
3. What to do about clover root weevil.

Delegates were also offered a number of afternoon tours and I chose the one that dealt with intensive lamb production. The presenters for this tour were outstanding and had obviously put in a deal of preparation along with the property owners and managers to ensure a worthwhile experience for the participants. We were hosted by EGL Pastoral and were addressed by one of the owners, Grant Ludemans, as well as two of the managers of their lamb trading operation at Winslow farm. There was a real enthusiasm for an evidence-based approach to decision making, and a thorough knowledge of the market place was also demonstrated. In terms of animal production, 10,000 ewes and 37,000 lambs were traded through the 216 ha of Winslow farm. The pasture system used is based on white clover and perennial ryegrass irrigated frequently and fertilised with urea. Small paddocks (around 4 ha) were used in an intensive grazing system for short pulses of grazing. Each paddock was irrigated continuously using the k-line system – taking about two weeks to



Following the tour there was the obligatory dinner...for our group we were hosted at Longbeach station (<http://www.longbeachestate.co.nz/index.htm>) a 1000 ha property rich with history and highly productive. However, at this stage of the day...as you can see agronomy had ceased to be the focus. Photo: Ted Wolfe.

cover the entire 4 ha. The soil was very shallow with available moisture holding capacity as low as 30 mm – hence the frequent irrigation of around 17 mm per fortnight. If it sounds intense then it is!

3rd International Rice Congress, Vietnam, November 2010

Dr Rachelle Ward, Rice Cereal Chemist, I&I NSW, Yanco

The 3rd International Rice Congress held in Vietnam in November 2010 attracted over 1,300 delegates from 60 countries. Dr Rachelle Ward, Cereal Chemist from Industry & Investment NSW Yanco attended the Congress to present a poster (see abstract below). The Prime Minister of Vietnam opened the Congress in which a range of rice related topics were discussed including grain quality, the role and importance of policy in the rice industry, and based on the current and forecast state of play of the global rice industry, the future research directions of rice researchers. Of particular interest was the need to empower women at every stage in agriculture and that it is mainly women who work in grain quality; the questions that were raised 20 years ago as a point of urgency appear to be the same ones raised today with the exception of climate change related issues; rice is a significant cultural part in the lives of many rice producers around the world that we really should be considering Genotype x Environment x Cultural interactions; and grain quality was always mentioned as a key research objective but the finer details of that objective were not discussed. As a cereal chemist, using these points of interest coupled with the current needs and directions of the local Australian industry, Rachelle can continue to formulate ideas for future research avenues and match those ideas with potential collaborators met during at the congress.

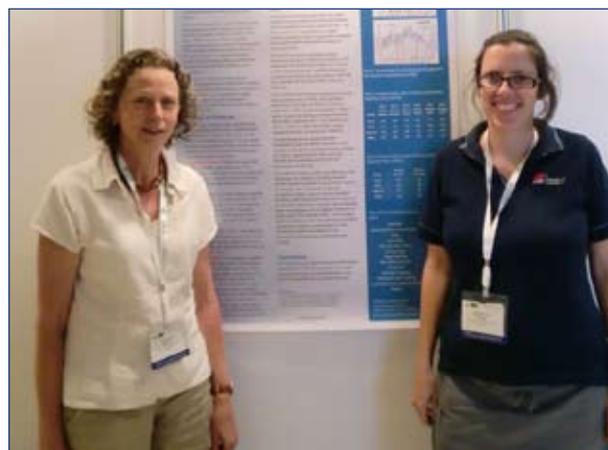
Post Harvest Treatment of Rice to Improve Head Rice Yield

Rachelle Ward, Margrit Martin and Elizabeth Mudford

Abstract

Opportunities to increase Head Rice Yield exist within the post harvest treatment of grain. Drying grain prior to milling can cause a decrease in Head Rice Yield, although studies have shown that tempering the grain can alleviate and in some cases increase the Head Rice Yield. This study extends upon previous studies that temper rice above the transition temperature to alleviate the stress in the grain that creates cracks upon drying.

In this study, four Australian medium grain rice varieties were harvested at various grain maturities. Grain was dried in ambient temperature and humidity conditions to achieve a moisture content of 15% - the ideal moisture for milling and storage. Both paddy (rough) and brown grain were prepared for tempering to assess the role of the hull during tempering. Grain was exposed to tempering conditions used to reflect commercial appraisal lab and tempering conditions used in literature. Changes to the Head Rice Yield and physical qualities of the grain will be discussed in a commercial context.



Ms Margrit Martin (left) and Dr Rachelle Ward with their poster presented at the 3rd International Rice Congress, in Vietnam, November 2010.

Visiting Scientists

Dr Yanmin Yang, China

Dr Yanmin Yang is a visiting scientist working at the Graham Centre with Dr De Li Liu. Dr Yang is an Associate Professor at the Center for Agricultural Resources Research, Institute of Genetics and Developmental Biology, Chinese Academy of Sciences. Her research interests are crop simulation modeling, managing agricultural water use, developing agricultural decision-support systems, and water-saving technology and impacts of climate change in agricultural systems. She developed SPSim - a sweet potato model and applied various crop models such as Gossym, Cotton2k, DSSAT-Ceres in her research in China. She has also calibrated and validated Cotton2k to include the Chinese agronomic practice of topping and pruning for cotton.

Dr Yang will conduct research on impacts of climate change on crop systems in NSW using APSIM. The project will examine the impact of climate change on crop yields and key phenological stages of major crops including wheat and Canola for different

growing regions in NSW. The aim is to guide the development of strategies to help crop producers adapt to the expected impacts of climate change.

Dr Yanjun Guo, China

Dr Yanjun Guo, a visiting scientist from the Faculty of Animal Science and Technology, Southwest University and funded by the Chinese Scholarship Council, has been working with the pasture and molecular groups in the Graham Centre since February 2010. During his stay, Dr Guo has conducted two experiments. The first experiment was to evaluate the acid tolerance of three new developed annual legumes, Bladder clover, biserrula and French serradella compared to two broadly used species, arrowleaf clover and subterranean clover. The work has been completed and a manuscript has been submitted to Crop and Pasture Science. Dr Guo has also conducted some molecular research work on responses of arbuscular mycorrhizal fungi (AMF) to lime application at the MASTER (Managing Acid Soil Through Efficient Rotation) site. This project was partly funded by the Graham Centre and collaborated with Professor Gavin Ash from Charles Sturt University as well as Dr Harsh Raman from I&I NSW. Dr Guo sequenced 520 clones and identified the AMF that distributed in perennial pastures in NSW. The significant influence of lime application on the AMF diversity provided new insight on how sustainably managing perennial pastures in acid soils.



Dr Yanjun Guo will return to China in March 2011 after working with the Graham Centre for the past 12 months.

Dr Guo will return to China in March 2011.

Professor M. Subhan Qureshi, Pakistan

Professor Qureshi is a distinguished academic and Chairman of the Livestock Management Department at the KP Agricultural University Peshawar Pakistan. Professor Qureshi presented a seminar "Stress Effects on dairy cattle fertility and production" at the School of Animal & Veterinary Sciences on 3 December. He outlined some of the key factors that impact on the reproductive efficiency of the Pakistani dairy herd. The fertility of small-holder herds is typically low as this is a physiological function that is not essential for survival.

Thus under-nutrition and nutritional imbalance through feeding high protein-low energy diets suppress ovarian cyclicity. Most often this can be determined by simply assessing the body condition scores of animals.

Interestingly ovarian activity is often negatively associated with insulin like growth factor 1 (IGF1) levels since this is associated with higher milk yields. Clearly nutrient partitioning is playing a role here particularly when cows and buffalo are underfed. Professor Qureshi then described how the fat component of milk changes with stage of lactation: milk fat generally becomes more saturated as lactation advances. Given that milk is designed to provide nutrition for calves clearly this mechanism may have a developmental role in the gastrointestinal tract of the calf as it approaches weaning. Interestingly, mid-chain length fatty acids (C12-C14) are more prevalent in milk from crossbred (Sahiwal-Friesian crosses) than in purebred Sahiwal milk in which shorter chain saturated fatty acids prevail.

The lead taken by Professor Qureshi to improve the productivity of dairy cattle in the cattle colonies located adjacent to Peshawar will provide a major challenge for his University as they seek to develop dairy extension activities for farmers operating in this important urban dairy system. The Graham Centre will be contributing to this ambitious program through our Agricultural Sector Linkages Dairy Program with Pakistan, coordinated by staff within the School of Animal and Veterinary Science.



Professor M. Subhan Qureshi presented a seminar at the School of Animal & Veterinary Sciences, CSU in December 2010. Photo: Raylene Heath.



The Graham Centre continues to support international RD&E through crop, pasture and animal sciences. The diversity of our farming systems provides many opportunities for adaptation to change such as variable climate. Photos: Deirdre Lemerle.

In The Limelight

Dr Michael Friend

Position: Senior Lecturer, Livestock Production

Organisation: Charles Sturt University

Career Brief

- 1996–2001 – Lecturer, CSU
- 2001 – Visiting Scientist, Scottish Agricultural College (Dumfries) and Macaulay Land Use Research Institute (Aberdeen)
- 2002 – Lecturer, University of Tasmania
- 2003 – Back to CSU!
- 2010 – Visiting Scientist, Utah State University

Research Activities

- Grazing systems for profit and environmental outcomes (aka 'EverGraze')
- Supervising a range of PhD and MSc projects

Teaching Activities

- Animal Nutrition
- Sheep production

Professional Links

- Australian Society of Animal Production

A typical day for me includes ... Replying to emails, phone calls, working on Milestone reports (mine and reviewing others), maybe some research and writing (if I'm lucky!), meeting with students and staff I supervise, teaching when in session.

My main project at the moment is ... EverGraze, plus my responsibilities as Program Leader for FFI CRC Program 1.

My favourite part of my job is ... No day is the same. Best bits are getting a project funded, getting good results, and getting the work published.

When I am not in the office I like ... Playing with my kids, doing things on my small farm, and when I get the chance (rarely now), going for a ride on my Ducati.

When I am driving I like to listen to ... JJJ (for you oldies it's a radio station – keeps you young at heart!), or a CD from the 70's.



Dr Michael Friend at the Evergraze site.

Dr Peter Martin

Position: Research Agronomist

Organisation: Industry & Investment NSW

Career Brief

- 1977– BAgSc. , Melbourne University, 1977
- 1977-1979 – Family farm
- 1979-1983 – PhD, Barley Yellow Dwarf Virus in wheat and related species. Melbourne University
- 1983-1994 – Wheat Breeder, Horsham, Victoria.
- 1994-2007 – Wheat breeder, Wagga Wagga Agricultural Institute
- 2007-present – Research Agronomist, Wagga Wagga Agricultural Institute

Research Activities

- Variety specific agronomy of wheat, canola and lupins, including row spacing, sowing time, seeding rate, stubble and canopy management.
- Genetic options for improving yield under moisture limited environments.

Teaching Activities

- Co-supervisor of PhD student, Felicity Harris
- Co-supervisor of honors student, Jaron Bennett
- Guest lecturer in agronomy

Professional Links

- Australian Wheat Breeding Society

A typical day for me includes ... Responding to emails, discussing day to day operations with my technical team. Depending on the season, responding to grower and agronomist requests for information on variety responses to a range of agronomy issues. Scoring trials for traits of interest, analysing data and then writing the reports.

My main project at the moment is ... Variety specific agronomy packages (VSAP).

My favourite part of my job is ... Seeing the information we produce being used by farmers and agronomists in the cropping programs.

When I am not in the office I like ... to fish, preferably fly fishing.

When I am driving I like to listen to ... Radio National or Wilson Pickett.

Autumn Edition of The Innovator

The Autumn Edition of The Innovator will be available mid April 2011. Submission of articles for this edition closes on **Friday, 18 March 2010**. Please email articles to Raylene Heath.



Dr Peter Martin's favourite past time is fly fishing.

Secretariat

Who's who and how to contact us

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Helen Burns (02) 6938 1947
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Mailing Address: EH Graham Centre for Agricultural Innovation, Charles Sturt University, Locked Bag 588, Wagga Wagga NSW 2678

Events Calendar 2011

| Date | What | Where | Contact |
|--------------------------------|------------------------------------|--|--|
| 15-16 February | GRDC Adviser Updates | Young Services Club | ORM Communications: (03) 5441 6176; admin@orm.com.au |
| 24 February | Conservation Agriculture Field Day | Lockhart Showground | http://www.canfa.com.au/ AnnouncementRetrieve.aspx?ID=41547 |
| Date(s) to be finalised | | | |
| June | Ag Enrichment Day | Wagga Wagga | Prof Deirdre Lemerle, T: (02) 6938 1667 E: dlemerle@csu.edu.au |
| August | Beef & Sheep Field Days | Joyes Hall, CSU, Wagga Wagga | Dr Jan Lievaart T: (02) 6933 2086 E: jlivaart@csu.edu.au |
| September | Graham Centre Field Day | Graham Centre Field Site, Corner Coolamon & Prices Road, Wagga Wagga | Prof Deirdre Lemerle, T: (02) 6938 1667 E: dlemerle@csu.edu.au |

We are pleased to advertise your events for 2011. Please email details to Maree, Raylene or Sharon.

CANFA Stubble Management Workshops

The Conservation Agriculture and No-till Farming Association (CANFA) is hosting a series of half-day stubble management workshops at a number of locations in March. The workshops will focus on issues farmers are likely to have with stubble retention in the coming season and work through options that may be most suitable for their systems. For more details contact Neville Gould (CANFA) Phone 02 6845 1044 or mobile 0427 452 488.

| Date | Where | Contact |
|----------|-------------------------|---|
| 7 March | Rankin Springs | Barry Haskins, I&I NSW, 0427 007 418 |
| 8 March | Merriwagga | Barry Haskins, I&I NSW, 0427 007 418 |
| 9 March | Griffith/Barellan | Barry Haskins, I&I NSW, 0427 007 418 |
| 14 March | Harden/Murrumburrah | Tony Pratt, I&I NSW, 0458 279 578 |
| 14 March | Holbrook | Chris Cummin, Holbrook Landcare, (02) 6036 3181 |
| 15 March | Corowa Yarrowonga | Fiona Hart, Riverine Plains, riverineplains@bigpond.com |
| 16 March | Deniliquin (2 sessions) | Fiona Hart, Riverine Plains, riverineplains@bigpond.com |