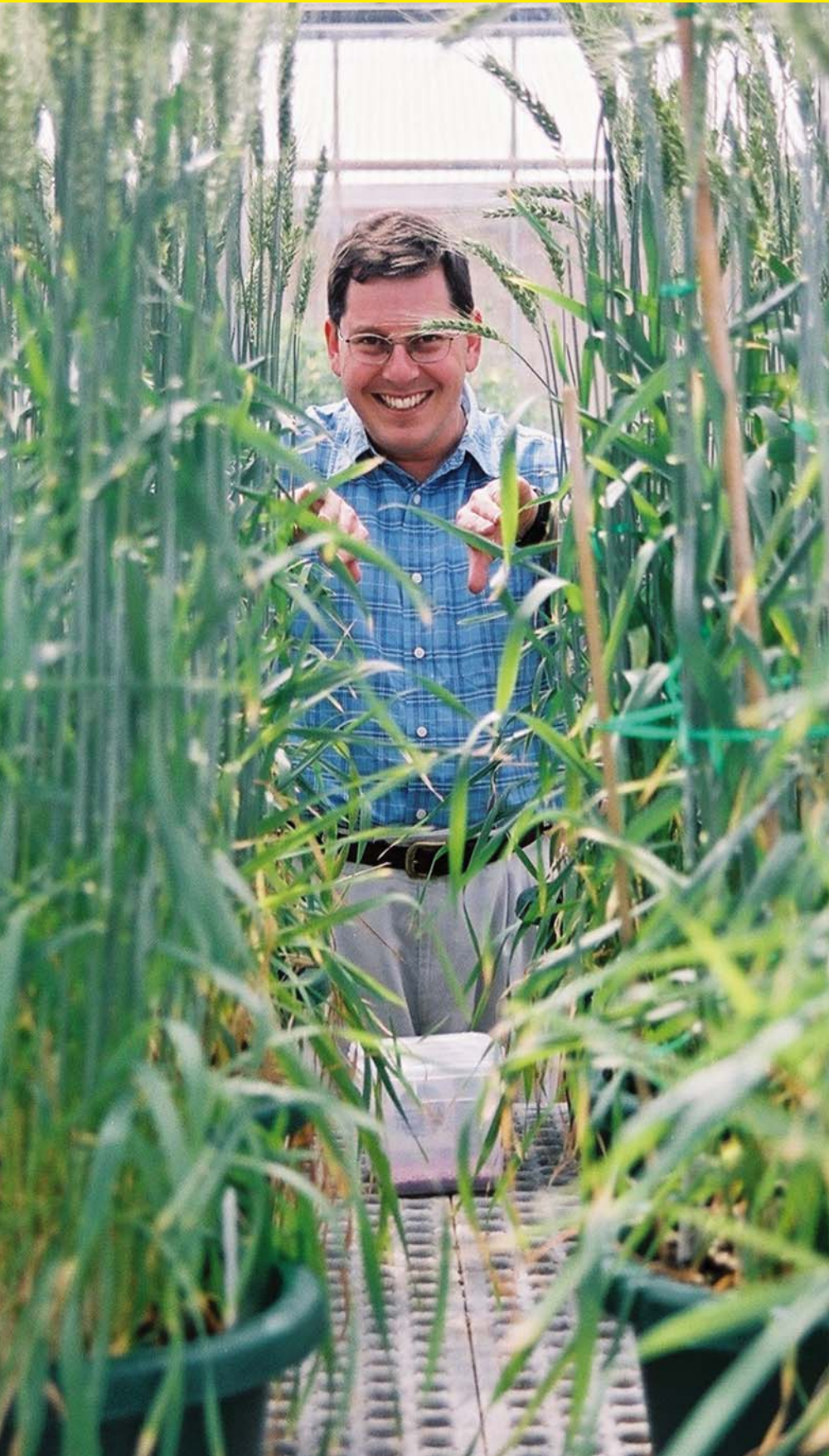


The University of Western Australia

# Newsletter Institute of Agriculture

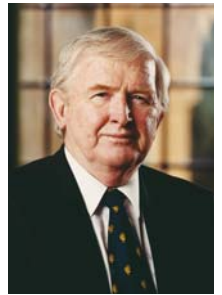


**Associate Professor Tim Colmer was awarded a 2006 Carrick Citation for Outstanding Contributions to Student Learning.**  
story page 9

## VICE-CHANCELLOR'S MESSAGE

**Professor Alan Robson**  
alan.robson@uwa.edu.au

**The Institute of Agriculture at UWA heralds a new era in teaching, research in agriculture and communication, which will benefit not only our State's agricultural sector, but also agriculture around the world.**



Vice-Chancellor Professor Alan Robson

Agriculture has been a cornerstone of activities at UWA since its foundation almost 100 years ago. Agriculture and related resource management is a major strength of the University today with our continued emphasis on international excellence recognised early this year with Life and Agricultural Sciences at this University ranked 37th in the world and 1st in Australia (Shanghai Jiao Tong Academic Ranking of World Universities by Broad Subject Field, 2007).

The Institute will see the strength of agricultural teaching and research at UWA continue to grow into the future. This will be achieved through the strong collaborative partnerships that the Institute has developed and is developing with local, national and international organisations.

I look forward to following the developments and achievements that flow from this exciting initiative.

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# Director's column

## Professor Kadambot Siddique

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### I welcome you all to the first newsletter of the Institute of Agriculture.

The University of Western Australia has had a long history of teaching and research in agriculture and natural resource management. The Faculty of Agriculture was established formally at the University in 1936. The Institute of Agriculture (IOA) was established in 1938 to provide critical research facilities and staff essential for the effective training of professional agricultural graduates and scientists at the post-graduate level. Formal activities of the IOA discontinued sometimes 1983-84, when School of Agriculture and various discipline groups were formed.

Recently the University has decided to re-establish its Institute of Agriculture to strengthen the cohesion of agriculture teaching and research within and between Faculties. The main objective is to facilitate and lead a more efficient co-ordination of existing strengths of the Faculty of Natural and Agricultural Sciences (FNAS) in teaching and research in agricultural science; strengthening the reputation of the University in agriculture by further enhancing links with industry, farmer groups, the community, national and international organisations.

In August 2006, I was appointed as the Chair in Agriculture and Director of the IOA. During the past few months I have met with a number of individuals and groups within and outside the University, while formulating a frame work and strategic direction for the Institute. A one-day workshop was held on 31st October to discuss



the future direction of the IOA. The workshop was attended by 50 members of the FNAS, other relevant groups within UWA and selected industry representatives. The workshop provided clear direction and strategies in formulating a vision, mission and structure for the IOA to enhance our teaching, research and communication.

### The Institute's Mission

"To advance research, training and communication in agriculture and resource management, for the benefit of mankind."

In working to achieve its mission the Institute will:

- Integrate UWA's agricultural research, training and communication under one umbrella.
- Provide a focus for leading-edge research and enhance and encourage innovative multidisciplinary research and development programs.
- Foster national and international linkages and alliances for mutual benefit
- Strengthen the reputation of UWA in agriculture by further enhancing links with industry, farmer groups, the community, and national and international organisations.

### The Institute's Vision

To be recognised for excellence in serving agriculture and resource management through education, training and research.

The IOA management structure includes an Executive Group and a Program Team (Figure 1). Both the teams have commenced their regular meetings to provide governance, training, research and communication directions to the IOA. The programs are structured in such a way that it extends across various schools, centres and discipline groups. The Institute's programs are developed under key themes relevant to future agricultural, food industries and resource management. The program team will act as a 'brains trust/think tank' and meets monthly. We are fortunate to have internationally recognized scientists as program leaders/deputy leaders within the Institute.

Table 1

### IOA Leaders and Deputy Leaders

<b>Program 1:</b> <b>Integrated Land &amp; Water Management</b> Leader: Professor Zed Rengel Deputy Leader: Dr Daniel Murphy
<b>Program 2:</b> <b>Animal Production Systems</b> Leader: Professor Graeme Martin Deputy Leader: Dr Phil Vercoe
<b>Program 3:</b> <b>Plant Production Systems</b> Leader: Professor Stephen Powles Deputy Leader: Dr Guijun Yan
<b>Program 4:</b> <b>Rural Economy, Policy and Development</b> Leader: Professor Matthew Tonts Deputy Leader: Mr Graeme Doole
<b>Program 5:</b> <b>Education, Outreach and Technology Exchange</b> Leaders: Professor Kadambot Siddique and Mrs Christine Richardson

The Vice Chancellor has appointed a fifteen member External Advisory Board (EAB) to the IOA. The members of the EAB represent the cross section of the agricultural industries and natural resource management areas (Table 2). The EAB's independent Chair is Mr Bruce Piper (grain grower and Chairman of the Council of Grain Growers Organisation (COGGO)). The EAB is the most important source of the Institutes industry interaction, advice and feedback. The EAB will meet twice each year and the inaugural meeting is scheduled on 30th March 2007.

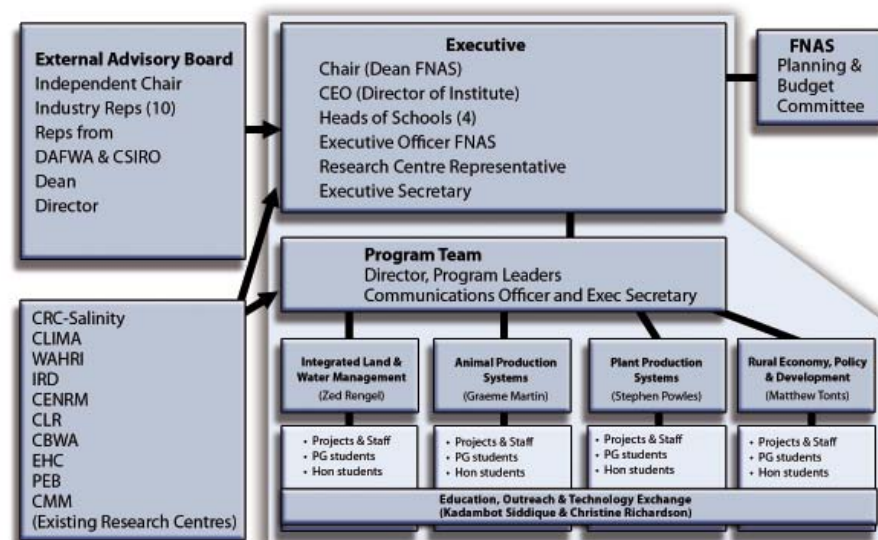
Our connection with real world of agriculture will be further strengthened thorough active collaboration with grower groups (Grower Group Alliance, Local Farmer Group Network, WA No-till Farmer association and Soil Health Extension) located at the UWA campus.

UWA's international reputation in Agriculture was recognized early this year with a ranking of 37th in the world and 1st in Australia (Shanghai Jai Tong Academic Ranking of World Universities: <http://ed.sjtu.edu.cn/ARWU-FIELD2007/LIFE.htm>).

During the past six months we have attracted several externally funded research projects in ag-

Figure 1

### Institute of Agriculture The University of Western Australia



riculture and resource management areas. We are a significant partner in the two new CRC's, which commence in July this year. Our collaboration with India and China was further strengthened through recent Memorandum of Understandings (MOU's) and research projects. A number of our staff were recognised for their excellence in scientific and teaching achievement. We had several national and international visitors to the Institute, including a high level delegation led by the Vice Chancellor of the Universiti Putra Malaysia

The total number of students in the BSc in Agriculture (and the combined degrees with Commerce and Economics) has remained fairly consistent over the last seven years. Growth in numbers depends on success in attracting students into the named agriculture-related programs. This appears to be working, with starting loads in our degrees being higher in 2007 than in the previous five years. Our post-graduate numbers are also growing with an increasing number of local and talented students from overseas countries, especially India, China and Pakistan.

Effective communication of agricultural research and training activities at UWA to the industry, farmer groups, collaborators (national and international), funding bodies potential students and alumni is one of the major objectives of the Institute. We have commenced our regular press releases (through Brendon Cant and Associates), newsletter, big picture lecture series, website and

other activities. Please contact us if you would like to be included in our mailing list.

I am excited about the future direction of the

Institute of Agriculture and look forward to your participation and support.

**Table 2**  
**External Advisory Board**

<b>Mr Bruce Piper - Chairman</b>	Farmer & Chairman, COGGO
<b>Mr Keith Gordon</b>	Managing Director, CSBP
<b>Mr Neil Young</b>	Farmer & Chairman, GRDC Western Panel
<b>Mr Philip Gardiner</b>	Farmer & Consultant
<b>Mr Imre Mentshelyi</b>	CEO, CBH Group
<b>Mr Garry Robinson</b>	Export Manager, Emanuel Exports Pty Ltd
<b>Mr Peter Trefort</b>	Principal, Hillside Meats and Board Director, Meat and Livestock Australia
<b>Dr Tony Fischer</b>	Honorary Research Fellow CSIRO, Canberra
<b>Dr Jim Fortune</b>	Executive Director, GWRDC
<b>Ms Naomi Arrowsmith</b>	Manager, Department of Environment, Albany
<b>Dr Don McFarlane</b>	WA Coordinator, Water for a Healthy Country Flagship, CSIRO, Perth
<b>Dr Peter O'Brien</b>	Managing Director, RIRDC
<b>Mr Roger O'Dwyer</b>	Executive Director, Industry & Rural Services, DAFWA
<b>Professor Alistar Robertson</b>	Dean, Faculty of Natural and Agricultural Sciences, UWA
<b>Professor Kadambot Siddique</b>	Director, Institute of Agriculture, UWA

## UWA collaboration with ICARDA

### Professor Kadambot Siddique

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Mr Geoff Smith, Executive Director COGGO and Prof. Kadambot Siddique, Director IOA, discuss collaborative opportunities with Dr Mahmoud Solh, Director General, and Dr William Erskine, Assistant Director General Research, ICARDA, Syria, December 2006.

**The International Center for Agricultural Research in the Dry Areas (ICARDA) is one of the 15 centres strategically located all over the world and supported by the Consultative Group on International Agricultural Research (CGIAR).**

ICARDA serves the entire developing world for the improvement of barley, lentil, and faba bean; and dry-area developing countries for the on-farm management of water, improvement of nutrition and productivity of small ruminants (sheep and goats), and rehabilitation and management of rangelands. In the Central and West Asia and North Africa (CWANA) region, ICARDA is responsible for the improvement of durum and bread wheats, chickpea, pasture and forage legumes and farming systems; and for the protection and enhancement of the natural resource base of water, land, and biodiversity.

Mr Geoff Smith, Chief Executive Officer of the Council of Grain Grower Organizations (COGGO) and I visited ICARDA during 10-13 December 2006. The purpose of our visit was to explore opportunities for collaboration and funding; and to discuss progress and future plans for the Australian Centre for International Agricultural Research (ACIAR) funded projects, on plant health management in pulses in the CWANA region and germplasm conservation and crop production in Iraq.

Mr Smith presented a seminar on COGGO activities, describing current projects and potential investment opportunities. Two key areas were identified for collaboration between ICARDA, COGGO, and UWA: Ascochyta blight resistance in kabuli chickpea, and Fusarium head blight resistance in spring bread wheat. ICARDA has developed (and continues to develop) several resistant varieties of both crops, which have been released in Australia or are potentially suited to Australian conditions.

Future collaborative opportunities between ICARDA and UWA were discussed in areas of undergraduate and post-graduate training with potential candidates from the region (including co-supervision by ICARDA scientists), staff sabbatical leave at UWA/ICARDA and joint publications. Priority areas of training included: plant breeding and molecular genetics, natural resource management, water management and integrated disease and pest management. A Memorandum of Understanding (MOU) between ICARDA and UWA is currently being finalised to cement the relationship.

## Institute of Agriculture Workshop

**Mr Mike Perry**

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Institute of Agriculture workshop participants involved in discussion

A one-day workshop was held on Tuesday 31st October 2006 to explore the future for the newly re-established IOA. The workshop was opened by Professor Doug McEachern, Deputy Vice-Chancellor (Research and Innovation), and was attended by about 50 members of the Faculty of Natural and Agricultural Sciences (FNAS) and associated groups.

The workshop's objectives were to:

Inform members of the Faculty and associated groups about the reasons for the University's decision to re-establish the Institute of Agriculture, and to explore what it might mean for the Faculty and its members; and

Capture constructive feedback on the concept from FNAS staff and other members of UWA to be incorporated into the ongoing planning for the Institute.

Participants heard from three introductory speakers, Dr Ross Kingwell (Department of Agriculture and Food Western Australia/ UWA), Mr Philip Gardiner (Farmer/Consultant) and Mr Kevin Goss (Cooperative Research Centre for Plant-based Management of Dryland Salinity) who gave their views on the social, economic, and business environment facing agriculture and resource management over the next decade. Professor Kadambot Siddique then presented his vision for the role of the Institute and invited input from the audience. Group discussions followed the presentation and ideas from the groups were fed back to all participants. In the afternoon, administrative arrangement for the operation of the Institute were discussed, including the contributions the Institute could make to the teaching, research and communication activities of the Faculty. The governance of the Institute was discussed, including the role of the Director, the formation of an Executive Group, and an External Advisory Board.

The concept of cross-disciplinary Research Themes was proposed as a way of presenting and developing the Institute's research programs, teaching and communication base. These points were analysed through further group discussion. The day concluded with comment from three senior members of the Faculty, Professors Stephen Powles, Bob Gilkes and Graeme Martin.

## New collaboration between Lanzhou University in China and UWA Institute of Agriculture

**Professor Kadambot Siddique and Dr Guijun Yan**

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Recently, UWA Institute of Agriculture was successful in their application for a **111** project supported by the Chinese Department of Education (CDE) in collaboration with Lanzhou University, China. The **111** programme was launched by CDE on 11 September, 2006 aiming at inviting 1000 world class academic masters from the world top 100 universities to establish 100 innovative research bases in China. University of Western Australia scientists Prof. Kadambot Siddique, Prof. Neil Turner and Dr Guijun Yan teamed up with scientists at Lanzhou University led by Prof. Fengmin Li to jointly prepare a proposal on "The sustainable development of agribusiness in dry and cold ecosystems." The successful proposal has secured funding of 9 million Chinese RMB (equivalent to about A\$1,500,000) for a five year period.

This funding will be used to jointly train researchers and postgraduate students in the study of



characteristics of dry and cold ecosystems, suitable crop production and animal husbandry options, and the long term strategies to accommodate the changed climate using west China as a model.

Lanzhou University is located in West China and is one of the top universities in China leading the research in agriculture under dry and cold environments. Australia, especially Western Australia has a similar dryland agricultural environment to West China and there is plenty of scope to collaborate on mutual areas of interest.

Under this joint arrangement, Prof. Siddique, Prof. Turner and Dr Yan will visit Lanzhou University later this year to give seminars/lectures and conduct cooperative research. We are also expecting a number of post-graduate students to spend part of their research program at UWA.

## The Universiti Putra Malaysia (UPM) establishes collaboration with UWA

**Professor Kadambot Siddique** ksiddiqu@fnas.uwa.edu.au

A high level delegation from UPM visited UWA in February 2007. The delegation consisted of: Prof. Dr. Nik Mustapha bin Raja Abdullah (Vice-Chancellor), Prof. Dr. Ghizan bin Saleh (Dean, Faculty of Agriculture), Assoc. Prof. Dr. Mohd Ridzwan bin Abd Halim (Coordinator, UPM – Australia/NZ collaboration) and Ms. Fairuz Bawaze'er Muchtar (Special Officer to the Vice Chancellor). The main purpose of the visit was to discuss collaborative opportunities in research and to train relevant UPM staff to PhD level especially in agriculture and resource management. This visit was a reciprocal visit to UPM by Professor Alan Robson (UWA Vice-Chancellor) and Professor Alistar Robertson (Dean Faculty of Natural and Agricultural Sciences) in May 2006. Subsequently Professors Kadambot Siddique and Graeme Martin have identified a number of potential PhD students and collaborative areas of research during their visit to UPM in June 2006.

During the visit, the delegation met with Senior Executives of the University and also interacted with Program Leaders of the Institute of Agriculture. They also visited research facilities at UWA, including the Shenton Park Field Station. Professor Ghizan Saleh and Assoc. Professor Halim also attended the School of Plant Biology's postgraduate summer school at Rottneest on 11 February along with Professor Siddique. The visitors interacted with staff and postgraduate students. They were impressed with the quality of the students and the program. Professor Ghizan has plans to implement similar summer school programs in his faculty at UPM.

The visit further strengthened collaboration between the two Universities. Several areas of future action have been identified. A number of candidates from UPM are expected to commence their PhD program at UWA this year.



L to R: Professor Alistar Robertson (Dean FNAS, UWA); Prof. Dr. Nik Mustapha bin Raja Abdullah (Vice-Chancellor, UPM) and Prof. Dr. Ghizan bin Saleh (Dean, Faculty of Agriculture, UPM) during their visit to UWA

# Western Australian Premier visits UWA agriculture collaborators in India

**Professor Kadambot Siddique** ksiddique@fnas.uwa.edu.au

**Honorable Alan J Carpenter (Premier Western Australia) visited the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) India on 20 February 2007. He was accompanied by Professor Doug McEachern (Deputy Vice Chancellor Research and Innovation) and Professor Mark Bush (Dean Faculty of Engineering, Mathematics and Computer Science).**

The University of Western Australia has established an excellent working relationship with ICRISAT over the years (since mid 1990's) primarily through the Centre for Legumes in Mediterranean Agriculture (CLIMA). Mr Carpenter saw the progress made by collaborative chickpea improvement project between ICRISAT, DAFWA and CLIMA funded by the Council of Grain Growers Organisation (COGGO). The collaborative project commenced in 2005 with a major objective to enhance desi chickpea with superior disease resistance and salinity tolerance. Mr Carpenter was impressed with the progress made so far. Western Australian growers will benefit from this project through accelerated development and commercial release of superior desi chickpea cultivars in the near future.

Mr Carpenter witnessed the exchange of MoU between ICRISAT and UWA. This MOU will provide enhanced opportunities for collaboration between ICRISAT and UWA especially in areas of post-graduate training with potential candidates from the region (including co-supervision by ICRISAT scientists), staff sabbatical leave and joint publications. Some of the priority areas of training includes: plant breeding and molecular genetics, natural resource management, climate change and adaptation, water management and integrated disease and pest management.

Over the years bright Indian students have received post-graduate training at UWA in a number of disciplines. Currently there are number of students from India undertaking PhD studies at UWA in agriculture and natural resource management areas with scholarships from a variety of sources.

UWA has exiting collaborations with Indian Council of Agricultural Research Institutions (ICAR) and a various Agricultural Universities. Mr Carpenter also travelled to New Delhi and met with Mr Sharad Pawar, Indian Minister for Agriculture to witness the signing of MoU between ICAR and UWA. This MOU between ICAR and UWA will consolidate and strengthen future such collaborations.



WA Premier Mr Alan Carpenter witnesses the exchange of MoU between Dr Dyno Keatinge (Deputy Director General, ICRISAT) and Professor Doug McEachern (Deputy Vice Chancellor Research and Innovation, UWA)

## UWA is partner in new CRCs

### The Future Farm Industries Cooperative Research Centre (FFI CRC)

**Georgina Wilson**

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The University of Western Australia will be a core partner in a new cooperative research centre which received Commonwealth Government funding approval just before Christmas.

The Future Farm Industries Cooperative Research Centre (FFI CRC) will succeed the CRC for Plant-based Management of Dryland Salinity (CRC Salinity) which has been based in the CRC Wing of the Faculty for the last six years. While continuing research into salinity problems, it will take a wider perspective based on perennial plants in broad-acre farming systems.

The successful re-bid involves \$34 million from

the Commonwealth Government over seven years, plus \$80 million in cash and in-kind contributions from other partners.

The University has committed \$100,000 per year and 4.1 full time equivalent staff positions (FTEs) to the new organisation. Named senior researchers include Professor David Pannell, Professor Zed Rengel, A/Prof Tim Colmer and Dr Phil Vercoe. Other researchers are also likely to be involved.

CEO Designate Kevin Goss said the new CRC had to have its research company in place by 31 May and be operational by 1 July. However decisions on commissioning of research projects would be

considered very carefully and proceed over the first two years – 2007-08 and 2008-09. Some existing CRC Salinity research projects would continue under the new banner.

The CRC's target market is 60 million hectares of farms and agricultural businesses in the crop-live-stock and high rainfall zones. Potential new industries flowing from changes to farming practices include bio-energy, timber products, charcoal for mineral processing, and seed and technology exports.

Besides UWA, FFI CRC is backed by the grains, wool and meat research corporations, Landmark, Kondinin Farm Improvement Group, six State Government departments, CSIRO, three other universities plus supporting partners. In WA, other core partners include the Department of Environment and Conservation and the Department of Agriculture and Food.

## CRC for Sheep Industry Innovation

Australia's sheep are headed for a rapid revolution in easy-care, wool comfort and delectable meat. Powerful new technology to transform the Australian sheep flock will come from the new Cooperative Research Centre (CRC) for Sheep Industry Innovation. Five thousand ewes in 'information flocks' across Australia and 20,000 genes in special arrays are the launch-pad for what researchers say will provide the biggest and fastest leap in sheep value and quality.

The new CRC team will comb the national sheep flock to find the right genes and identify breeding values for:

- easy-care sheep, with high lamb survival rates and good welfare characteristics
- a wool fleece designer-bred for luxurious wearer-comfort

## Professor Graeme Martin

- pure-white wool, for textile end-use versatility
- meat that is perfectly specified for the healthiness, nutrition, flavour, aroma and tenderness demand by today's discerning consumer.

The new CRC has 20 partners including the peak industry bodies, all state departments of primary industries, three prominent sheep industry consulting companies, feed and technology companies, two universities, Australian Meat Processor Corporation and the industry research companies Australian Wool Innovation (AWI) and Meat and Livestock Australia (MLA). AWI and MLA have each committed \$10 million to research and development in the new CRC over the next seven years. With the Commonwealth's investment of \$35.5 million, this gives a total cash budget of over \$55 million. Add the in-kind allocation of research staff

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and the value of the commitment to transforming the sheep industry is well over \$100 million, over the next seven years.

The School of Animal Biology at UWA will participate in the CRC, particularly through the sub-program focusing on easy-care sheep, with high lamb survival rates and good welfare characteristics. This will involve work under the "clean, green and ethical" banner with major inputs from Dr John Milton, Dr Carolina Vinales, Ms Beth Paganoni, Dr Dominique Blache and Prof. Graeme Martin, in collaboration with the Department of Agriculture and Food Western Australia. The major themes will be embryo and fetal mortality, fetal programming, neonatal mortality and maternal behaviour, colostrum physiology, temperament genetics and stress physiology, and nutritional requirements.

## CLIMA grows into phase three at UWA



CLIMA Director, Professor Neil Turner, DAFWA researchers Dr Angelo Loi and Bradley Nutt and GRDC Western Panel Chairman, Neil Young of Kojonup at the commercial release this week of AGWEST Sothis, the world's first commercial variety of Eastern star clover. photo: Brendon Cant and Assoc.

**Innovation in legume science and technology remains the focus of the Centre for Legumes in Mediterranean Agriculture (CLIMA) as it moves into its third phase as a research centre within UWA.**

CLIMA has been headquartered at UWA's Crawley campus since commencing in 1992 as a Co-operative Research Centre (CRC) and transforming in 2000, after its CRC phase ended, into a research alliance between the WA Department of Agriculture and Food (DAFWA), UWA, CSIRO and Murdoch University. The current memorandum of understanding between the four partners concludes on June 30, 2007.

Recently the CLIMA Board endorsed a plan to continue CLIMA as a research centre at UWA from July 1, with continued collaboration with DAFWA, CSIRO and Murdoch University. Announcing the new phase, CLIMA Board Chairman and UWA Faculty of Natural and Agricultural Sciences Dean, Professor Alistar Robertson said industry input

to CLIMA's operations would be facilitated by the Advisory Board to the UWA Institute of Agriculture. CLIMA Director from 2001 to 2006, Professor Kadambot Siddique, is Director of the Institute.

Professor Neil Turner, who in August last year succeeded Professor Siddique as CLIMA Director, will continue in that role, as originally planned, until retiring at the end of June 2007, when UWA will appoint a new Director. According to Professor Turner, who spent 30 years with CSIRO and has been involved with CLIMA since its inception, CLIMA will retain its focus on beneficial outcomes for WA growers and maintaining strong links to other Australian and overseas legume research groups. The international links include several important projects with the International Centre for Agricultural Research in the Dry Areas (ICARDA) in Syria and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India.

## Addressing soil health in Western Australia

**Ms Jessica Sheppard**

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Samples from different layers in the soil profile are examined.

**A dynamic project, aimed to increase landholders overall knowledge of and capacity to manage soil health throughout the agricultural zone of Western Australia, was initiated in 2006. Dr Dan Murphy, Leader of the Soil Biology group at UWA together with Dr Frances Hoyle (Department of Agriculture and Food Western Australia), lead this project.**

The aim of the project is to conduct on-farm benchmarking of soil health parameters with the long-term goal of developing methods to monitor aspects of soil health related to productivity and ecosystem maintenance. On-ground work in this project includes:

- assessing grainbelt catchments for soil health issues,
- identifying the current level of knowledge for soil health issues and management in various regions,
- conducting workshops with landholders to improve soil health knowledge, and;
- establishing long-term monitoring sites.

Dr Murphy and Dr Hoyle have been liaising with farmer groups to determine sites for soil sampling. Groups interested in soil health are organising fifteen to twenty farmers in their group to nominate two paddocks for sampling, preferable sown to wheat in 2007. The involved growers, and any other interested landholders, are invited to a general information workshop at the start of the year to find out about the project activi-

ties and explain some of the soil analyses. A final workshop is run in the following year to provide all the soil and production data and discuss constraints and how their catchment compares to other regions.

The Soil Health Initiative project was a major contributor to the inaugural Western Australian Soil Health Forum held in March 2007 at UWA. An interactive website, being developed as part of the project, was launched by Dr Murphy at the Forum. The site ([www.soilquality.org.au](http://www.soilquality.org.au)) will be a database of all results from the soil and plant sampling conducted through the soil health project. Landholders will be able to enter their soil test results to compare to State and/or catchment averages. Factsheets, articles and case studies will also be available to download from the site.

This soil health project is being conducted through UWA and funded by the Avon Catchment Council (ACC), Land and Water Australia, Grains Research and Development Corporation (GRDC) and South Coast Regional Initiative Planning Team (SCRIPT) through the National Action Plan for Salinity and Water Quality. This collaborative research effort has developed excellent links across government agencies, regional councils, local grower groups and agribusiness.

## The status of youth in rural areas

**Professor Matthew Tonts**      mtonts@cyllene.uwa.edu.au

Over the last two decades there has been a steady decline in the number of youth moving into rural communities throughout Australia (Table shows migration trends for the grainbelt region). Generally, inland agricultural communities are the most seriously impacted by this trend. Coupled with high rates of youth out-migration, many rural communities are facing difficulties in attracting youth to fill skilled job vacancies and apprentice positions. Declining youth in-migration also has social consequences, effectively reducing the capacity of rural communities to replenish their skill base and social networks through traditional avenues.

During 2006 the Institute for Regional Development at UWA conducted a study to identify how perceptions of living and working in Western Australia's grainbelt influenced university students and graduates willingness to move to these regions for work. This study built on previous research which identified the major factors that influence rural

based youth to move away from country areas. The major reason why youth leave rural areas is to access employment, education and social opportunities available in larger towns and cities. This recent study examining urban based youth intentions to move to rural areas found that some of the barriers to youth moving to rural areas were:

A perception that small rural communities were largely socially isolating compared to the social opportunities available in large towns and cities.

Rural areas and industries offer minimal opportunities for career advancement. In particular those involved in law and business felt that rural areas offered little in the way of career advancement. On the other hand, those in natural and agricultural sciences, education and medicine expressed more optimism about the potential career opportunities in rural areas.

When comparing the responses of those who live, or had lived, in rural areas to those that had little experience in rural communities it was found that the perceptions of the first group were far more positive than for the latter. Those that had previously lived in the region were far more likely to move back to rural areas than those that had limited connection with rural communities.

# Industry groups tour UWA agricultural research

**Dr Debbie Thackray** djthack@clima.uwa.edu.au

In September 2006 farmers and extension officers from the Lower Eyre Agricultural Development Association (LEADA), led by consultant Mr Kieran Wauchope, visited UWA to find out about various agricultural research and development activities currently being undertaken.

Professor Kadambot Siddique kicked off the day with an overview of the UWA Institute of Agriculture – its mission, research, development and extension activities, followed by an invited summary from Kieran of the LEADA group's interests and farming constraints, which helped researchers to home-in on their particular needs.

The morning's presentations included talks from researchers in the School of Earth and Geographical Sciences on sub-soil constraints, soil health, root rots and damping-off, nutrient uptake, role of nitrogen & sulphur nutrition, impact of deep-placed fertilizers, and soils knowledge communication.



The LEADA (Lower Eyre Agricultural Development Association) group spent a day at UWA viewing agricultural research activities, including a tour of CLIMA work in the glasshouses.

The visitors were given brief overviews of some of the legume research carried out by the Centre for Legumes in Mediterranean Agriculture (CLIMA) and then took a tour of CLIMA pre-breeding research projects being done in the laboratory and glasshouses.

The agronomy group from School of Plant Biology presented latest results on hardpan penetration, osmotic adjustment, and perennial wheat. The LEADA group also visited UWA's Shenton Park Field Station for some hands-on demonstrations of the activities undertaken by Canola Breeders Western Australia and CLIMA.

The day finished back in the Institute with a summary of work being done by the WA Herbicide Resistance Initiative (WAHRI) on resistance mechanisms, preventing weed seed development, and new herbicides for annual ryegrass and wild radish, followed by some welcome refreshments.

We hope to welcome more industry groups in 2007.

For further information contact UWA Institute of Agriculture.

Overall, the research found that perceptions of lifestyle and employment opportunities do influence willingness to move to rural communities.

Table 1: Migration Trends: the number of youth entering and leaving the wheatbelt as a per cent of total population entering and leaving the grainbelt Region, 1981

		81-86	86-91	91-96	96-01
IN	Male	885	849	804	687
	% of total IN	10	8	7	13
	Female	1005	1006	906	744
	% of total IN	11	9	8	14
OUT	Male	1687	1581	1487	1387
	% of total OUT	13	12	11	22
	Female	1787	1743	1670	1617
	% of total OUT	13	14	13	25



Ben Biddulph at his Sprouting trial in September 2005 at Esperance Downs Research Station, Gibson.

## South Coast Sprouting; Solution in hand for wheat

**Mr Ben Biddulph**

tbiddulph@agric.wa.gov.au

Ben Biddulph, originally from Ravensthorpe, has just completed a three and a half year PhD funded by the Grains Research and Development Corporation, looking at the tolerance of wheat to sprouting on the South Coast around Esperance. Sprouting is a problem in the coastal regions of the wheatbelt when late season rainfall induces germination before the grain is harvested. This sprouting results in poorer quality traits due to the production of enzymes which reduce the ability of the grain to make bread. From a growers perspective this results in downgrading to feed grades with a 20% lower return. Ben's trials in Esperance have looked at advanced wheat breeding lines which have seed dormancy traits and are able to avoid sprouting. These wheat lines were able to maintain their quality despite the late season rainfall in the Esperance region experienced over the past four seasons, and importantly this dormancy was lost before seeding in the subsequent season.

Ben also found the level of dormancy and hence sprouting tolerance is influenced by the conditions during grain filling and maturation. Stressful conditions during grain filling appear to increase dormancy while stressful conditions during grain maturation appear to reduce the dormancy. However, from a grower's perspective these small changes in dormancy did not reduce the level of protection from late season rainfall enough to result in downgrading. The level of dormancy in the advanced breeding lines will be sufficient for sprouting tolerance once it is transferred into commercial varieties.

After submission of his PhD thesis Ben resumed employment with the Crop Improvement team at the Department of Agriculture and Food, Western Australia (DAFWA) supporting the efforts in developing abiotic stress tolerance in wheat. Ben's PhD thesis was supervised by Associate Professor Julie Plummer (UWA) and Dr Tim Setter (DAFWA).

# Science education leads the way for tomorrow's innovation

**Colin Hawke**

chawke@fnas.uwa.edu.au



Dr Martha Ludwig and Dr Patrick Finnegan enjoy a practical investigation with scholarship students.

Attracting bright and creative minds to agricultural science education and research careers is crucial for ensuring a sustainable and profitable future for Australian agriculture. The best place to discover the next generation of Australian scientists is in the school classroom.

Over the past four years the Primary Industry Science Program has been introduced into selected secondary schools in WA and Tasmania. The program, funded by the University of Tasmania, UWA, the Grains Research and Development Corporation (GRDC) and the Department of Agriculture and Food Western Australia (DAFWA), reaches out to students and science teachers, linking classroom science courses to tertiary science programs and research. Exciting career pathways in many fields of primary industry science are explored and the value of tertiary studies highlighted.

The programs design and procedure builds effective relationships between schools, university and industry through an annual integrated strategy with five phases:

- A Science Education Officer delivers presentations to individual science classes, illustrating cutting edge research and the importance of science to industry.
- A two-day program of professional development is provided for teachers, revealing current research and highlighting the relevance of classroom science to industry.
- Selected students participate in a five-day Industry Camp in December which illustrates the career and research opportunities for agricultural science students.
- Individual students are placed with a team of scientists in research and industry organisations for five days in January, under an Industry Placement Scholarship program.
- Selected teachers work with industry scientists and university researchers to provide science teaching resources.

Each year more than 2000 year 11 and 12 science students are contacted about the program and 20 students are selected from written application and interview for scholarships. The teachers and students who have been involved so far have provided very positive feedback across all aspects of the program, and many of the students have shown a keen interest to pursue natural and agricultural science related careers. Currently, the Primary Industry Science Program is offered to 28 schools across country and metropolitan regions in WA, but more schools will be included in 2007.

# UWA agriculture students hard to resist

With an abundance of tertiary disciplines available, students can find it hard to choose an undergraduate degree that will set them up with exciting, fulfilling careers. Tarnya Fowler and Natalie Maguire made the right choice studying at the UWA Faculty of Natural and Agricultural Sciences, securing good jobs before graduating and now working in WA's \$2 billion grain industry. Both completed their final year projects with the WA Herbicide Resistance Initiative (WAHRI), a major strategic initiative by the Grains Research and Development Corporation within the School of Plant Biology at UWA.

Australian growers annually spend an average of \$40,000 on crop and pasture chemicals and weeds cost Australian agriculture \$4 billion a year. WAHRI is committed to research, development and extension to help maximise sustainable crop production by reducing the adverse impact of herbicide resistance.

Ms Maguire, from Turee Creek Station, Newman in WA's Pilbara region, chose to complete a Bachelor of Science in Agriculture at UWA. Now employed in a graduate agronomy position with Elders at Merredin in WA's central wheatbelt, she expects to apply many aspects of her training and research with WAHRI to her new role. Ms Maguire said that her fourth year project, together with the expert advice and guidance of WAHRI staff, gave her a good grounding in herbicide resistance, enabling her to approach weed management with a sharp awareness of an expanding problem. She wanted to work within agriculture and considered that the degree delivered scientific and practical aspects of the industry, while providing a broad knowledge base to build on. Ms Maguire selected UWA because of its good reputation and its agricultural science degree was highly regarded nationally and internationally recognised.



UWA Agriculture students, Ms Tarnya Fowler and Ms Natalie Maguire (photo: Brendon Cant and Assoc.)

Ms Fowler, from a Carnamah wheat and sheep farm, graduates in mid-2007 with a Bachelor of Agricultural Science and Bachelor of Commerce, but has already begun a National Australia Bank graduate analyst position and will move to Albury, NSW, mid-year. Reflecting on her time at UWA, she believes a team effort helped her get to this point in her career. She considered that one of the great parts about being an agriculture student at UWA is the tight knit peer group working together. Another positive was the wide range of disciplines available, with a balanced emphasis on the practical and theoretical, which constantly kept her interested and motivated. Ms Fowler thought that the degree course was great, because it provides opportunities for a variety of jobs, from a farm, to a laboratory, or a bank. There is now an added bonus with a double degree offered at UWA, so agriculture students can simultaneously do complementary degrees and safeguard their future.

# Adoption of conservation practices by rural landholders

Professor David Pannell

David.Pannell@uwa.edu.au



Much of the focus of government policies for land and water conservation is on changing the behaviour and management practices of rural landholders. However, these policies often neglect the large body of evidence about what it takes to achieve such

changes. Professor David Pannell, of the School of Agricultural and Resource Economics, led a team that has provided a review of this area, published in October 2006.

The team was multi-disciplinary (two economists, three rural sociologists and a social psychologist) and came from five research organisations (UWA, University of New England, University of Tasmania, Charles Sturt University and Dept. Primary Industries Victoria).

Highlighting the level of interest in this issue, the paper rose rapidly to the top of the list of the journal's most downloaded papers for the past 12 months.

Adoption is essentially a process of learning that proceeds through several phases: (i) awareness of the problem or opportunity; (ii) non-trial evaluation; (iii) trial evaluation; (iv) adoption; (v) review and modification; and (vi) non-adoption or dis-adoption.

A very diverse range of social, cultural, personal and economic factors influence the rate of adoption, including: the landholder's goals, family pressures, education, social networks, and economic capacity.

To be adoptable, a new practice needs to be attractive to landholders, meaning that it helps to advance their goals. Often conservation policies are based on optimistic views about what landholders will adopt, but in reality, many conservation practices have characteristics that mean they are not adopted as rapidly or as widely as some wish.

It also helps with adoption if the new practice is easy for the landholder to trial on a small scale, and if such trials are informative about the long-run performance of the practice. Again these requirements are not always met for conservation practices.

If a practice is not adopted in the long term, it is because landholders are not convinced that it advances their goals sufficiently to outweigh its costs. For policy makers, this means that they should avoid putting the main burden for promoting adoption onto communication, education and persuasion activities (often called "extension" within agricultural circles). This strategy is unfortunately common, but is destined to fail if the innovations being promoted are not sufficiently attractive to the target audience. The innovations need to be 'adoptable'. If they are not, then communication and education activities will simply confirm a landholder's decision not to adopt, and degrade the standing of the field agents of the organisation. Extension providers should invest time and resources in attempting to ascertain whether an innovation is adoptable before proceeding with extension to promote its uptake.

For further details on this research, the full paper is available at the journal web site:

<http://www.publish.csiro.au/nid/72/paper/EA05037.htm>

## Award winning teaching in Agriculture

**Associate Professor Tim Colmer was awarded a 2006 Carrick Citation for Outstanding Contributions to Student Learning. The citations are part of the Carrick Australian Awards for University Teaching. The citation for A/Prof. Colmer is for excellence in teaching and collaborative leadership to enhance the student experience, particularly within the Faculty of Natural and Agricultural Sciences.**

A/Prof. Colmer's teaching focuses on responses and adaptations of plants to adverse environments, and the integration of processes from the cellular to whole plant levels. He considers that hands-on experience is essential for students learning plant science. Therefore, laboratory- and field-based teaching, evaluation of scientific literature, and group discussions are important components of his courses. A/Prof. Colmer currently supervises or co-supervises six PhD students and two undergraduate research students. He was also awarded the Excellence in Teaching Award (Undergraduates) for the former Faculty of Agriculture in 1997 and 2001. In addition to his own teaching, A/Prof. Colmer is currently the Associate Dean for Teaching and Learning in the Faculty of Natural and Agricultural Sciences (FNAS), and the Chair of the Faculty Teaching and Learning Committee.



Associate Professor Tim Colmer awarded for his excellence in teaching at UWA.  
photo: Georgina Wilson

## UWA scientist sounds warning on weed control

A research paper calling for international action to halt the spread of glyphosate-resistant weeds has won a major award. Professor Stephen Powles, Director of the WA Herbicide Resistance Initiative at UWA, received the Award for Outstanding Research Paper for 2006 from the American journal, 'Weed Technology'.

The award is a great honour, particularly the international recognition in the United States and beyond. Professor Powles is already an Institute of Scientific Information highly-cited laureate as one of the world's most cited plant scientists. His paper 'Evolved Glyphosate Resistance in Plants: Biochemical and Genetic Basis of Resistance', was co-written with Dr

Christopher Preston from the University of Adelaide.

Glyphosate - often known as Roundup - is considered the world's greatest herbicide and controls weeds infesting soya beans, maize, cotton and canola that are genetically modified to withstand glyphosate. Thus glyphosate can be sprayed and the crop is unaffected but the weeds infesting the crop will die. These glyphosate-resistant crops now dominate north and south American crop production.

While a great economic success, there is growing evidence that weeds have been developing a resistance to the herbicide with big economic consequences for farmers. This study concludes that large areas of the

United States, Argentina and Brazil - where glyphosate-resistant weed crops are intensively grown - are under particularly strong glyphosate-selection pressure.

The paper cited eight weed species which have shown resistance to glyphosate, including ryegrass in Australia. Professor Powles' paper argues that solutions to the problem included greater diversity in agro-ecosystems and less use of glyphosate. Whilst glyphosate makes great contributions to world food production, it needs to be conserved for future harvests. Like antibiotics for human health, only through restraint and smart use of glyphosate will it continue to contribute to world food production.

# New Book on “Producing Table Olives” launched at UWA



Professor Stan Kailis with the Chairman of the Western Australian Olive Growers Association, Mr Mike Baker (right) and co-author Dr David Harris (left).

**Armed with a variety of locally produced olives for tasting, Prof. Stan Kailis (UWA) and Dr David Harris (Chemistry Centre WA) launched their new book “Producing Table Olives” at UWA on March 2nd 2007.**

The aim of the manual is to provide olive growers and processors with internationally based guidelines for ensuring the quality and safety of processed table olives. The manual covers all aspects essential for the production of safe, nutritious and marketable table olives including site selection, recommended varieties, pest and disease control, primary and secondary processing and quality and safety testing.

The book is comprehensive and presented in a straightforward style. It is likely to appeal not only to Australian growers but also to international audiences.

In addition to the launch, Prof. Kailis was also presented with a “National Industry Award” for his contribution to the Australian Olive Industry

For further information on the publication: [www.publish.csiro.au](http://www.publish.csiro.au)

## Institute of Agriculture Food and Agriculture Lecture

### ‘A DECADE OF GENETICALLY MODIFIED (GM) CROPS AROUND THE WORLD: FUTURE DIRECTIONS

Professor Stephen Powles, FTSE

Institute of Agriculture The University of Western Australia

GM soybean, maize, cotton and canola dominate American, Canadian, Brazilian and Argentinean agriculture. Indeed, GM crop adoption in the America's has been the fastest adoption ever of an agricultural innovation. Similarly, the Australian cotton crop is now nearly all GM. Adoption of GM crops in China and India is well underway. Production of GM maize is occurring in some European countries. Notwithstanding this demonstrated grower enthusiasm for GM crops, consumer opposition to GM crops persists in some parts of the world, particularly Europe.

This presentation will provide an over-view of the decade of adoption and impact of GM crops around the world and implications for the future.

Professor Stephen Powles is the Director of the Western Australian Herbicide Resistance Initiative (WAHRI) within the School of Plant Biology, and Leader of Plant Production Systems Program, Institute of Agriculture at UWA. He is an international authority on all aspects of herbicide resistance from basic biochemical understanding of how plants develop resistance, through to practical management on-farm. He is equally interested in both the generation of new knowledge and its application in cropping systems.

**Thursday, April 19th, 2007**

**5.00 – 6.00 pm**

**Geography 2 Lecture Theatre, UWA**

**(Ground Floor, Geography-Geology Building)**

**Fairway, Crawley. Entrance No.1, Car Park 18 or 20.**

**Enquires [ioa@fnas.uwa.edu.au](mailto:ioa@fnas.uwa.edu.au)**



## Industry Awards and Scholarships

NAME	TOPIC	FUNDING BODY
<b>Megan Chadwick</b> (PhD student)	Salt tolerance of ewes' offspring fed saltbush during pregnancy	Land and Water Australia
<b>Cameron Beeck</b> (Research Officer)	Breeding for improved stem strength and disease resistance in field pea.	Grains Research and Development Corporation
<b>Penelope Goldsmit</b> (Honours)	Seed ecology of buffel grass ( <i>Cenchrus ciliaris</i> L.) on Dirk Hartog Island.	Weed CRC
<b>Niall Keegan</b> (Honours)	Over-summer survival and competition between two insect species ( <i>Mogulones geographicus</i> and <i>Mogulones larvatus</i> ) released in Australia for biological control of Patterson's curse.	Biosecurity CRC and Weeds CRC
<b>Holly Swarbrick</b> (Honours)	Topdressing with ALOSCA® as an effective way of reinoculation of current and improved <i>Rhizobium</i> strains.	Frank Broomhall Scholarship
<b>Di Mayberry</b> (PhD student)	Travel to attend the VII Symposium on the Nutrition of Herbivores, Beijing, China, 16-22 September, and The 12th Seminar of the FAO-CIHEAM Sub-Network on Sheep & Goat Nutrition, Thessaloniki, Greece, 11-13 October.	Mike Carroll Travelling Fellowship
<b>Shane Friesen</b> (PhD student)	Travel to attend the Resistance 2007 Conference at Rothamsted Research Institute, England, and to visit the National Institute for Agricultural Research (INRA), Dijon France, 6-11 April.	Mike Carroll Travelling Fellowship
<b>Nathan Cattle</b> (Honours)	Economics of scale in farming systems of the West Australian wheatbelt	Australian Agricultural and Resource Economic Society Honours thesis prize for WA 2006.
<b>Frank D'Emden</b> (MSc student)	Adoption of Conservation Tillage in Southern Australia: An Application of Duration Analysis.	Australian Agricultural and Resource Economics Society award for Best Master Thesis.
<b>Joanne Castelli</b> (Research Associate)	Travel to attend the International Symposium on Iron Nutrition in Plants in Montpellier to present a poster entitled, “GmYSL1, a putative iron chelate transporter in symbiotic beans”.	Plant Nutrition Trust, Alf Anderson Award

## Recognition

NAME	AWARD
<b>Associate Professor Tim Colmer</b>	2006 Carrick Institute Award for Australian University Teaching
<b>Professor Stephen Powles FTSE</b>	Weed Technology Journal Outstanding Research Paper for 2006
<b>Professor David Pannell</b>	Australian Agricultural and Resource Economics Society "Connections Award" for article contributions that fitted best the aims and intent of the journal "Connections: Farm, Food and Resource Issues".
<b>Dr Patrick Finnegan</b>	2006 Excellence in Teaching Award- Individual teaching
<b>Dr Erik Veneklaas</b>	2006 Excellence in Teaching Award - Postgraduate Research Supervision
<b>Professor Stan Kailis</b>	Australian Olive Association "National Industry Award" for his contributions to the Australian Olive Industry.

## New PhD Students

NAME	TOPIC	SCHOOL	SUPERVISOR(S)
<b>Ms Caroline Versteeg</b>	Nutrient cycling in the farming systems	Earth and Geog Sci	Prof Zed Rengel and Dr Craig Russell
<b>Mr Leroux Beyers</b>	Commercial and environmental implications of fertiliser use	Earth and Geog Sci	Prof Zed Rengel
<b>Mr Saeedreza Vessal</b>	Functional genomics studies on germination of chickpea seed under drought stress	Plant Biology	Prof Craig Atkins, Prof Kadambot Siddique and Dr Jairo Palta (CSIRO)
<b>Ms Trina Jorre</b>	Brain pathways in reproduction in sheep	Animal Biology	Prof Graeme Martin and Dr Penny Hawken
<b>Mr Shahab Maddah Hosseini</b>	Contribution of carbon assimilates from awns, flag and penultimate leaves to grain filling in barley under well-watered and terminal drought conditions	Institute of Agriculture	Dr. Kazem Poustini (Iran), Professor Kadambot Siddique and Dr Jairo Palta (CSIRO)

## Visitors to Institute of Agriculture

Name of the Visitor	Visitors' organisation and country	Host details	Dates	Host contact Email
<b>Mr Seyyed Md Reza Ehteshami</b>	Tarbiat Modrres University, Iran	Prof. Zed Rengel	Oct 2006 – Aug 2007	zrengel@fnas.uwa.edu.au
<b>Dr Anke Herrmann</b>	Newcastle, U.K.	Dr Daniel Murphy	June 2005 – July 2007	dmurphy@cyllene.uwa.edu.au
<b>Professor Zhao Zhizhong</b>	Hainan Normal University, PR of China	Dr Andrew Rate	Sept 2006 – Sept 2007	andrew.rate@uwa.edu.au
<b>Dr Ming-Qi Zheng</b>	Beijing Agricultural University	Dr Daniel Murphy	June 06 – 7 July 07	spowles@plants.uwa.edu.au
<b>Dr Pascal Poindron</b>	Laboratoire de Comportement UMR 6175 INRA-CNRS-Université de Tours-Haras Nationaux, Physiologie de la Reproduction et des Comportements, INRA, France	Dr Dominique Blache	June 2007 – May 2008	dbla@animals.uwa.edu.au
<b>Dr Maria Fredberg</b>	Faculty of Life Sciences, University of Copenhagen, Denmark	Dr Dominique Blache	Feb 2007 – June 2007	dbla@animals.uwa.edu.au
<b>Dr Arild Angelsen</b>	Dept of Economics & Resource Management Norwegian University of Life Sciences, Norway	School of Agricultural and Resource Economics	June 2006-May 2007	bwhite@fnas.uwa.edu.au
<b>Dr Elize van Lier</b>	Animal and Forage Sciences Department, Faculty of Agriculture, Universidad de la República, Montevideo, Uruguay	Dr Dominique Blache	Feb 2007 – April 2007	dbla@animals.uwa.edu.au

## New Research Projects

TITLE	FUNDING BODY	SUPERVISOR(S)
Role of organic matter and soil biota in optimising crop nutrition in sustainable farming systems	ARC Linkage Project Industry partners- DAFWA, ERA Farming	Prof. Zed Rengel
Physiological and genetic mechanisms underlying tolerance of bread wheat to ion toxicities	ARC Linkage Project Industry partner- DAFWA	Prof. Zed Rengel, Dr Tim Setter, Dr Robin Wilson
Aluminium uptake across the root-cell plasma membrane	ARC Discovery Project	Prof. Zed Rengel
Phosphorus - A Key Factor in the Development of Novel Perennial Herbaceous Deep-rooted Pasture Legumes	ARC Linkage-Project Industry partners- DAFWA, CCWA, Heritage Seed, Mingnew Irwin Group, Facey Group	Prof. Kadambot Siddique, Dr Mark Tibbett, Dr Mike Bolland and Dr Clinton Revell

## Publications 2007

### Scientific Journal

Barbetti MJ (2007) Resistance in annual *Medicago spp.* to *Phoma medicaginis* and *Leptosphaerulina trifolii* and its relationship to induced production of a *phytoestrogen*. *Plant Disease* **91**, 239-244.

Bonnardeaux Y, Brundett M, Batty A, Dixon K, Koch J, Sivasithamparam K (2007) Diversity of mycorrhizal fungi of terrestrial orchids: compatibility webs, brief encounters, lasting relationships and alien invasions. *Mycological Research* **111**, 51-61.

Llewellyn RS, Lindner RK, Pannell DJ, Powles SB (2007) Herbicide resistance and the adoption of integrated weed management by Western Australian grain growers. *Agricultural Economics* **36**, 121-128.

Pederson BP, Neve PB, Andreason C, Powles SB (2007) Ecological fitness of a glyphosate resistant *Lolium rigidum* biotype: Growth, competitiveness and seed production along a competition gradient. *Basic and Applied Ecology* (in press) available on-line.

Siddique KHM, Regan KL, Malhotra RS (2007) Registration of 'Nafice' Kabuli Chickpea cultivar. *Crop Science* **47**, 436-437

Siddique KHM, Regan KL, Malhotra RS (2007) Registration of 'Almaz' Kabuli Chickpea cultivar. *Crop Science* **47**, 437.

Turner NC, Abbo S, Berger JD, Chaturvedi SK, French RJ, Ludwig C, Mannur DM, Singh SJ, Yadava HS. (2007). Osmotic adjustment in chickpea (*Cicer arietinum* L.) results in no yield benefit under terminal drought. *Journal of Experimental Botany*. **58**, 187-194.

Yu Q, Cairns A, Powles S (2007) Glyphosate, paraquat and ACCase multiple herbicide resistance evolved in a *Lolium rigidum* biotype. *Planta* **225**, 499-513

Danehlouepour N, Yan G, Clarke HJ, Siddique KHM (2007) Diallel analyses reveal the genetic control of resistance to ascochyta blight in diverse chickpea and wild *Cicer* species. *Euphytica* **154**, 195-205

### Book

Kailis S and Harris D (2007) Producing Table Olives. CSIRO Publishing, Collingwood, Vic. Australia.

## Meetings and Events

Institute of Agriculture Food and Agriculture Lecture, The University of Western Australia. A decade of genetically modified (GM) crops around the world: Future directions, Prof Steve Powles  
**19 April, 2007** [www.ioa.uwa.edu.au](http://www.ioa.uwa.edu.au)

Western Australian Wine and Food Festival, Perth, Western Australia  
**2-4 June, 2007** [www.wineandfood.com.au/index.html](http://www.wineandfood.com.au/index.html)

Clean, Green and Ethical Animal production -Thai-Australian Partnership in Education Workshop, Bangkok, Thailand  
**4-5 July, 2007** [dbla@animals.uwa.edu.au](mailto:dbla@animals.uwa.edu.au)

Agribusiness Livestock Updates  
**24-25 July, 2007** [www.agric.wa.gov.au/livestockupdates](http://www.agric.wa.gov.au/livestockupdates)  
or email [ajones@agric.wa.gov.au](mailto:ajones@agric.wa.gov.au)

5th Australian Controlled Traffic Farming Conference, Muresk, Western Australia  
**23-25 July, 2007.** [www.actfa.net/conferences/ctf2007/gae.bessen@wantfa.com.au](http://www.actfa.net/conferences/ctf2007/gae.bessen@wantfa.com.au)  
or email

Agribusiness Livestock Updates, DAFWA, Perth  
**24-25 July, 2007** [www.agric.wa.gov.au/livestockupdates](http://www.agric.wa.gov.au/livestockupdates)  
or email [ajones@agric.wa.gov.au](mailto:ajones@agric.wa.gov.au)

Grain West Expo 2007, Perth  
**26-27 July, 2007** contact Charlene Kolman or John Duff on 08 9475 0753

UWA EXPO, University of Western Australia  
**19 August, 2007**

The 13th Australian Barley Technical Symposium, Esplanade Hotel, Fremantle, Western Australia  
**26-30 August, 2007** [www.promaco.com.au/2007/abts/index.htm](http://www.promaco.com.au/2007/abts/index.htm)  
or email [michelle@promaco.com.au](mailto:michelle@promaco.com.au)

Dowerin Field Day, Dowerin, Western Australia  
**29-30 August, 2007** [www.dowerinfielddays.com.au/index](http://www.dowerinfielddays.com.au/index)

WANTFA Spring Field Day, Meckering, Western Australia  
**11 September** [www.wantfa.com.au](http://www.wantfa.com.au)

Fifteenth Biennial Australian Research Assembly on Brassicas (ARAB) Conference, Geraldton, Western Australia  
**10-14 September, 2007** [msanders@agric.uwa.edu.au](mailto:msanders@agric.uwa.edu.au)

10th International Plant Virus Epidemiology Symposium, Hyderabad, India  
**15-19 October, 2007** <http://www.IPVE2007.net>

6th European Grain Legumes Conference, Lisbon, Portugal  
**12-16 November, 2007** [www.eugrainlegumes.org](http://www.eugrainlegumes.org)

2nd International Salinity Forum, Adelaide, South Australia  
**31 March - 3 April, 2008** <http://www.internationalsalinityforum.org>

5th International Crop Science Congress 2008, Jeju, Korea  
**13-18 April, 2008** [www.cropscience2008.com/index.htm](http://www.cropscience2008.com/index.htm)

12th International Lupin Conference, Fremantle, Western Australia  
**14-18 September, 2008.** [www.lupins.org](http://www.lupins.org)  
or email [conference@lupins.org](mailto:conference@lupins.org)

This is the first Institute of Agriculture Newsletter.

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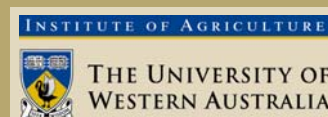
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