



# BEANSTALK

Centre for Legumes in Mediterranean Agriculture Newsletter



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## **Important Date**

The CLIMA 2003 Christmas Party will be held on the 17th of December



## **New Lupin Website**

**[www.agric.wa.gov.au/lupinvirus](http://www.agric.wa.gov.au/lupinvirus)**

You can find more details in this newsletter

The **CLIMA BIENNIAL REPORT** 2001-02 is now completed and can be found on the CLIMA website **[www.clima.uwa.edu.au](http://www.clima.uwa.edu.au)**  
A hard copy can be obtained from Greg Madson **[clima@cyllene.uwa.edu.au](mailto:clima@cyllene.uwa.edu.au)**

## FROM THE DIRECTOR

**Professor  
Kadambot Siddique**

**ksiddiqu@agric.uwa.edu.au**



Following some very useful rainfall during the May-June period throughout the grain belt of WA, the majority of farmers have completed their crop and pasture seeding operations. I encourage CLIMA researchers to participate in relevant major field days during this growing season, in order to promote their research projects on legumes to the farming community and industry groups. Dr Debbie Thackray, CLIMA's Communication Manager will be happy to assist you in this.

The feedback on CLIMA's industry forum for smaller businesses in April was positive and a summary of the major outcomes is presented in this edition of the Newsletter. Mr Trevor Flugge, Chairman of the CLIMA Industry Advisory Group (IAG), has recently been appointed by the Federal Government to lead an Australian team, operating under the auspices of AusAID and attached to the US Office of Reconstruction, that will help Iraq to rebuild its agricultural sector in the aftermath of the war. CLIMA management and staff wish him well in this very important task. Mr Robert Sewell, Chairman of GPWA (The Grain Pool of WA) and Deputy Chairman of CBH (Cooperative Bulk Handling), has kindly agreed to act as CLIMA

IAG Chairman during Trevor's periodic absences from WA. On 9 July, the CLIMA Governing Board will meet to discuss the progress of our research projects and finalise the budget allocation for 2003-4.

Dr Clinton Revell, Department of Agriculture (DAWA), has recently joined the CLIMA Program Management Team (PMT). Dr Revell will replace Associate Professor Mike Ewing as the leader of the Annual Pasture Legume Improvement sub-program. I am grateful to Assoc. Prof. Ewing for his leadership and support to CLIMA activities over a number of years, especially since I became the Director. Assoc. Prof. Ewing will continue to be involved in various aspects of legume pasture research at CLIMA.

Recently, CLIMA organised a Workshop under the chairmanship of Dr Mark Sweetingham (DAWA), to which key scientists associated with genomics research from CLIMA's Research Alliance organisations were invited. This was the first meeting of CLIMA's Legume Genomics Working Party which has been set up to develop a CLIMA position paper on Legume Genomics. The objective is to outline a consensus view of leading scientists on priority research for molecular markers, structural genomics, functional genomics, transformation and utilisation of legume biodiversity. The working group, with the assistance from other expert scientists, is currently developing the draft position paper, which will be circulated widely once completed. The paper is expected to be useful in setting the policy and investment priorities of CLIMA's Governing Board, our alliance organisations and relevant funding bodies.

A joint GRDC-CLIMA workshop on "Seeding future for grains in aquaculture feeds" was organised on 28<sup>th</sup> May in Fremantle for more than 30 participants by Dr Brett Glencross, CLIMA associate with the Department of Fisheries W.A. The main objective of the workshop was to review recent progress in identifying prospective high value aquaculture feed ingredients from grains, especially lupins. The meeting identified a number of research and development areas to further enhance lupin kernel as a high value aquaculture feed. Most of these will be addressed by Dr Glencross and his team in a recently funded GRDC project through CLIMA.

For the past couple of months, I have been busy co-ordinating the development of a large research proposal on "Germplasm enhancement of lupin; realising the potential through molecular and genomic approaches". When funded, this major collaborative effort between leading CLIMA associated scientists from UWA, Murdoch, CSIRO and DAWA, will add a new dimension to lupin genetic improvement using the insights and unique capabilities of mutation, interspecific hybridisation and molecular biology. The proposal has been submitted to potential funding bodies, including GRDC, for their consideration.

Professor Bert Vandenberg, Pulse Crop Chair of the Crop Development Centre (CDC) at the University of Saskatchewan, and Mr Gordon Bacon, CEO of Pulse Canada, visited CLIMA in April and presented seminars on "Pulse research and industry development in Canada". They also discussed the progress of existing collaborative projects between CLIMA and CDC.

CLIMA approved five Travel Top-Up Awards to early career researchers during 2002-03 and my hearty congratulations to the successful candidates.

I would like to welcome Dr Megan Ryan, the newly appointed Pasture Science Lecturer in the School of Plant Biology at UWA. Dr Ryan will be interacting with CLIMA annual pasture legume researchers to identify potential areas of collaboration and development of new projects. I extend my welcome to Mr Kioumars (Kiou) Ghamkhar, Post-doctoral Fellow who has recently joined CLIMA to work on molecular and eco-geographical characterisation of pasture germplasm. I would also like to welcome Dr Judith Lichtenzvieg, a Molecular Biologist. Dr Lichtenzvieg will be based at Murdoch University and she will be working on project "Genetic dissection of fungal disease resistance in legumes using *Medicago truncatula*"

CLIMA has been selected as a University Centre to be audited by the Australian Universities Quality Agency (AUQA) during August 11 to 13, 2003. The University of Western Australia, Faculty of Natural and Agricultural Sciences and CLIMA welcomes the audit and supports its underlying rationale of "fitness for purpose". The audit may involve various aspects of CLIMA's functions, its staff, associates, collaborators and industry partners. I look forward to your support and co-operation in the above audit and will communicate the details of the audit process as soon as they are available.

Recently a number of excellent scientific and review articles were published by CLIMA scientists, which are listed in this Newsletter and will soon be listed on the CLIMA website as well. We have also

just published CLIMA's Biennial Report for 2001-2002, which provides a comprehensive summary of CLIMA's research projects and their progress. I encourage everyone to read the Report. Limited hard copies are available at CLIMA, but the Report is also available on our website.

### CLINTON REVELL TO LEAD PL3 AND NAPLIP

Dr Clinton Revell has recently taken on the leadership of the CLIMA Annual Pasture Legume Improvement subprogram (PL3) and the National Annual Pasture Legume Improvement Programs (NAPLIP). He is replacing Associate Professor Mike Ewing, who has been leading NAPLIP and PL3 for a number of years and will now focus on his commitments to the Salinity CRC. Dr Revell has been Project Manager for the Pasture Management Project at the Department of Agriculture (DAWA) since 1997 and moved into the role of Pasture Program Leader for DAWA in May 2003. He also has ongoing links with the CRC for Australian Weed Management.

Dr Revell's involvement with pasture research started when he was first employed at DAWA in 1984 as a Research Officer. In 1993, he was granted study leave to undertake postgraduate studies at the CRC CLIMA and University of Western Australia from which he graduated with a PhD in 1997. The focus of Dr Revell's

pasture research has been on the development of new annual pasture legume species for soils in the Western Australian wheatbelt that have been unable to support productive subterranean clover pastures. His work has contributed to the development of the burr medic species (*Medicago polymorpha*) and a number of serradella species including yellow serradella (*Ornithopus compressus*) and French serradella (*Ornithopus sativus*), assisted in the commercialisation of Santiago and Caliph medic and Paros, Madeira and Cadiz serradella, and also contributed to the on-farm management of these new pastures. Dr Revell is currently investigating the impact of annual pastures in phase farming systems, particularly in relation to weed management, and including aspects of herbicide tolerance of annual pastures.



*Dr Clinton Revell, the new leader of subprogram PL3*

<b>Grain Legume Program (GL)</b>		<b>Leader: Dr Mark Sweetingham</b>
<b>Sub-program</b>	<b>Major components</b>	<b>Leader</b>
GL1 Germplasm Development	<ul style="list-style-type: none"> <li>Genetic Resources</li> <li>Breeding technologies</li> </ul>	Dr Bevan Buirchell
GL2 Disease & Pest Management	<ul style="list-style-type: none"> <li>Resistance</li> <li>Integrated Pest Management</li> </ul>	Prof. Richard Oliver
GL3 Agro-ecological Adaptation	<ul style="list-style-type: none"> <li>Physiological, biochemical and molecular basis of environment interactions</li> <li>Improved screening methods for resistance/tolerance</li> </ul>	Adj. Prof. Neil Turne
GL4 Grain Quality, Utilization & Product Development	<ul style="list-style-type: none"> <li>Improving grain appearance, composition and processing properties</li> <li>Legume feed research</li> <li>Processing research, food uses and health benefits</li> </ul>	Dr Mark Sweetingham
<b>Annual Pasture Legume Program (PL)</b>		<b>Leader: Professor Clive Francis</b>
<b>Sub-program</b>	<b>Major components</b>	<b>Leader</b>
PL1 Germplasm Development	<ul style="list-style-type: none"> <li>Genetic resources acquisition to support pasture legume development</li> <li>AQIS liaison</li> <li>Development of offshore projects in legume breeding and selection for specific tasks, rhizobial selection, seed increase</li> </ul>	Mr Richard Snowball
PL2 Biotic Interactions	<ul style="list-style-type: none"> <li>Legume/animal interface</li> <li>Legume/symbiont interface</li> <li>Legume/pest and disease interface</li> </ul>	Dr Soressa Kitessa
PL3 Annual Pasture Legume Improvement	<ul style="list-style-type: none"> <li>Evaluation, selection and breeding</li> <li>Seed production</li> <li>Regional testing for adaptation</li> </ul>	Dr Clinton Revell
PL4 Novel Uses of Forage Legumes	<ul style="list-style-type: none"> <li>Pharmaceutical, aquacultural, horticultural and agriceutical uses</li> </ul>	Assoc. Prof. John Howieson

## MOLECULAR MARKERS IN ACTION IN LEGUME GENETIC IMPROVEMENT

by Dr Hua'an Yang

A molecular marker which cheaply and reliably identifies anthracnose resistance in lupins has been developed with funding from CLIMA, Grains Research and Development Corporation and The Department of Agriculture (DAWA). Using the marker to confirm if desired resistance genes are present in lines from new crosses will eliminate the need for disease nursery testing until late in the breeding cycle.

Molecular markers can be used to screen and identify the presence of many agronomically significant genes in plant breeding programs, and CLIMA scientists are rapidly translating molecular marker technology into practical legume genetic improvement.

A molecular marker needs to meet three requirements to be useful for marker-assisted-selection (MAS) in a breeding program: it must be

- (1) linked to a significant trait required by the particular industry
- (2) reliable and reproducible across laboratories
- (3) cost efficient

With the arrival of new technologies and concepts in molecular biology such as AFLP and bulked segregation analysis (BAS), the difficulty in developing molecular markers for practical use in a breeding program often lies in the step of converting them from non-specific markers into cost-effective and sequence-specific markers. To

address this problem, CLIMA has developed a new DNA fingerprinting technology called MFLP (ref: Molecular Breeding 7: 203-209), capable of producing many co-dominant polymorphisms that are easy to convert into sequence-specific, PCR-based markers and ideal for routine marker implementation.

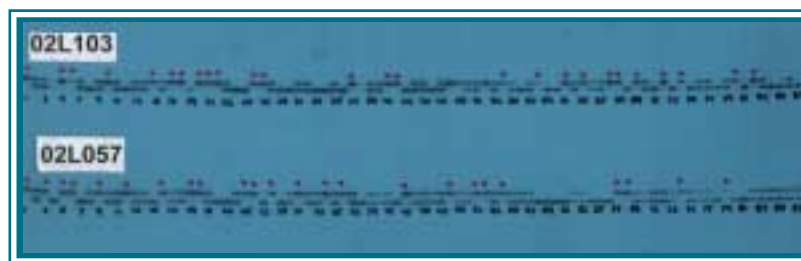
By using the MFLP technique, the molecular marker research group has developed two molecular markers tagging a gene conferring anthracnose resistance, and another two markers tagging a gene conferring phomopsis stem blight resistance in narrow leaved lupin. All these markers are co-dominant, sequence-specific, simple PCR-based, have low running cost, and are suitable for practical marker implementation.

2002 was the first year to see molecular markers being used for MAS in lupin breeding, when 2715 samples in the Australian National Lupin Breeding Program were screened using the molecular markers tagging anthracnose resistance and phomopsis resistance. This year, well over 3000

samples from the program will be screened and selected by the markers. The development and implementation of molecular markers provides significantly improved efficiency in lupin breeding. In the conventional breeding cycle, lines from crosses would not be screened for anthracnose resistance until F7. Using MAS, the lines from crosses can have their DNA evaluated in F2 and only those with homozygous markers linked to disease resistance are selected and transplanted, thereby eliminating the undesirable plants early in the breeding cycle (Figure 1).

The work on lupin marker development and implementation has benefited from close collaboration between the molecular biologists (Dr. Huaan Yang and Mr Jeffery Boersma), the plant breeder (Dr Bevan Buirchell), and the plant pathologists (Dr Mingpei You and Dr Mark Sweetingham).

For further information, please contact Dr Huaan Yang [hyang@agric.wa.gov.au](mailto:hyang@agric.wa.gov.au) on 08) 9368 3557.



*Marker assisted selection in action in the Australian National Lupin Breeding Program. On a single gel, a total of 188 F2 plants (94 plants each from the two crosses of "02L103" and "02L057") were screened with the co-dominant, simple PCR based molecular marker tagging the anthracnose resistance gene in *Lupinus angustifolius*. The F2 plants with the susceptible marker (showing the lower band only) and the F2 plants with heterozygous resistance marker (showing two bands) are eliminated. Only the plants with homozygous resistance markers (showing the top band only, plants marked with red dots) are selected and entered into further evaluation in the breeding program.*

## GOING DOTTY - ANALYSING SPATIAL DATA

by Dr Debbie Thackray

Researchers in the Plant Virology Group based at the Department of Agriculture (DAWA) have been using a relatively new type of analysis to examine mapped virus incidence data. Spatial Analysis by Distance IndicEs (SADIE) is a system developed by Prof. Joe Perry, at Rothamsted Experimental Station in the UK, to do spatial analysis on ecological data, especially data in the form of counts at mapped locations. It describes the spatial features of a set of counts independent of their numeric properties and can also evaluate the evolution of this structure over time. The software is available free from the SADIE website: <http://www.iacr.bbsrc.ac.uk/pie/sadie/>.

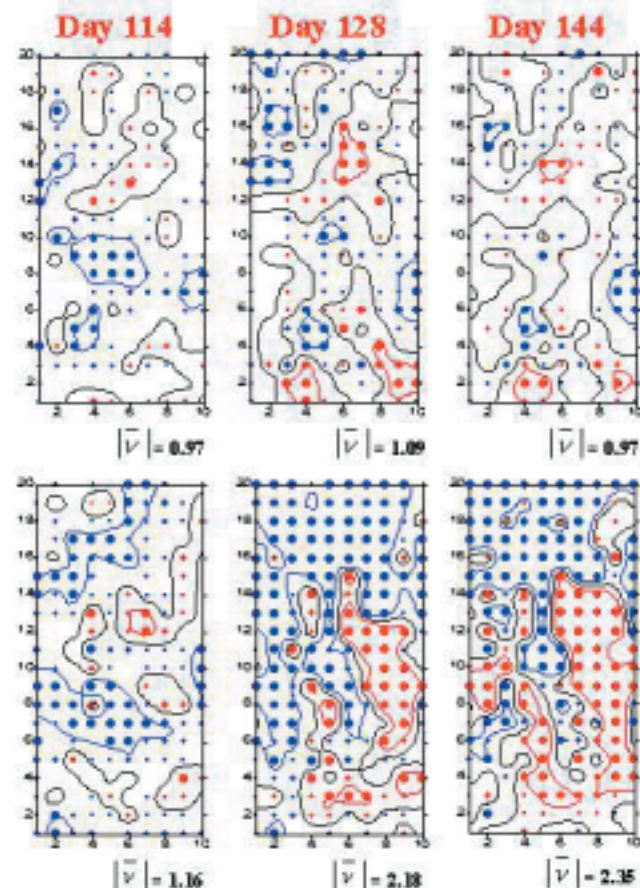
At the VIII<sup>th</sup> International Plant Virus Epidemiology Symposium held at Aschersleben in Germany in May 2002, Dr Debbie Thackray (CLIMA) and Ms Lindrea Latham (DAWA) presented posters on work in which they have used SADIE. Virus incidence in field plots of lupin and faba bean was mapped by dividing plots into measured quadrats and counting numbers of infected plants in each. SADIE was used to test for non-randomness and quantified clustering into patches (or gaps) of infection. Large positive values of the clustering index “v” indicate that a quadrat forms a patch cluster with large counts in neighbouring quadrats. Large negative values of “v” indicate that a quadrat forms a gap cluster with relatively small counts

in neighbouring quadrats. Contour maps were produced, based on the value of “v” for each quadrat, allowing visual comparisons of different sets of analysed data.

Debbie used SADIE to show that the spread of the non-necrotic type of bean yellow mosaic virus (BYMV) is less diffuse, with considerably more localised infection surrounding infection sources, than the necrotic type of BYMV in narrow leafed lupins. This helped with interpreting the effect that each type has on lupin yields. When SADIE was used to compare the spread pattern over time for new infections of the same BYMV type, it showed that association between dates was stronger for the non-necrotic type.

Lindrea used SADIE to show that the degree of clustering of infection of two different viruses in faba bean increased gradually over time, but clusters developed faster with BYMV than with pea seed-borne mosaic virus. After initial arrival of aphid-borne virus infection from external sources, clustering of infection of either virus was mainly around these virus foci. With later spread, clustering was related to wind direction and its impact on aphid movement.

A detailed paper on the BYMV spatial analysis was published in the *Annals of Applied Biology* (Vol. 141: 45-59). Copies of the posters presented by Debbie and Lindrea can be obtained from Debbie.



SADIE maps of clustering for three different assessment dates (days after sowing) for cumulative numbers of plants with necrotic (top 3 maps) or non-necrotic (bottom 3 maps) BYMV symptoms in lupin plots without introduced foci. Red and blue contours enclose patches and gaps of infection respectively, where clustering exceeds expectation by 50% (“v” > + or - 1.5 respectively). Increasing size of dots indicates increasing values of +ve or -ve “v”.

## TRAVEL NEWS

**Search for Genetic Resources in Caucasus**

by Professor Clive Francis

Professor Clive Francis (CLIMA) renewed CLIMA linkages with the world famous Vavilov Institute in St Petersburg as part of the 'National Initiative on Plant Genetic Resources' supported by GRDC. Linked to this initiative is a genetic resource based project in the Central Asian and Caucasian Republics, supported by ACIAR and managed by CLIMA associate Dr Ken Street who is now curator of the extensive ICARDA legume collection. As CLIMA is a partner in the project, Professor Francis was able to visit the Caucasian Republics of Georgia and Armenia prior to his visit to the Vavilov Institute. He teamed up with



*Ms Rusudan Dzidzishvili (Academy of Sciences, Georgia), Dr Michael Mackey (Head of the Australian Cereals Collection) and Ms Tamriko Jinjikhadze (Georgian genetic resources coordinator) among wheat land races in Georgia.*

Dr Ken Street and the Georgian and Armenian genetic resource coordinators, Ms Tamriko Jinjikhadze and Ms Natalia Rukhkyan, who both earlier visited Australia and studied gene bank management with Dr Michael Mackay, curator of the Australian winter cereal collection.

The Central Asian and Caucasian Republics are the major centre of origin of modern wheat and are therefore of special interest to the world of plant genetic resources. From the CLIMA perspective, the region is also known for its diversity of land races and wild relatives of chickpea and lentil. The Botanical Institute in Yerevan, Armenia, is undertaking a specific study on the distribution of the grain legume wild relatives, led by eminent botanist Dr Estella Gandilyan whose husband is acknowledged as a world authority on wild relatives and the evolution of modern wheat. Given this unique knowledge of the distribution of grain legume relatives and herbarium specimens at the Vavilov Institute, a specific plant collection tour is planned for next year involving CLIMA and the Armenian, Georgian and Vavilov Institute specialists. This would target lentil and chickpea wild relatives, land races and more modern farmer cultivars. Molecular techniques would allow estimation of the contribution of the wild relatives to the cultivated varieties as well as the prospects of their utilisation to improve disease and insect resistance in our cultivars.

**International Collaboration is a Two-Way Street**

by Dr Jens Berger

An important component of CLIMA's ACIAR (Australian Centre for International Agricultural Research) project on "Traits for yield improvement of chickpea in drought-prone environments of India and Australia" is technology exchange between the two countries. To this end, a series of long courses entitled "An Introduction to Modern PC-based Data Handling and Statistical Methods" were held in Nepal and India throughout February and March 2003. The Nepali course was not part of our original obligations, but came about through some quick thinking by Ms Renuka Shrestha, a Nepalese PhD student at CLIMA, who suggested that if we were going to give two courses to the Indians, why not add one for Nepal? A short discussion with Professor Clive Francis (CLIMA), some emails to ACIAR and the Nepal Agricultural Research Council (NARC), and we were up and running: a good example of how linking projects through CLIMA can add value in unexpected ways.

A few months later in late February, Ms Jane Speijers (Senior Biometrician, DAWA) and I found ourselves in a beautiful Gurkha hill station called Lumle, perched on the edge of the Annapurna range with 24 super-keen scientists from a broad range of backgrounds including aquatic ecologists, pathologists, plant and animal breeders. All were eager to learn how to make the best use of the increasingly available modern PCs in their research. Well, modern PCs are certainly

spreading throughout the Indian subcontinent, but they hadn't reached Lumle yet! Jane and I were prepared for Windows 95 and up, having brought several versions of SPSS with us on CD. But after we handed out the course material and prepared to start, we were stunned to discover... no CD drives! I looked at Jane and wondered 'were we sunk before we even began'? But luckily up popped the resourceful local IT manager who had a single internal CD drive and proceeded to dismantle each machine and install the necessary software and course data, while Jane and I began our lectures. This event set the tone for the rest of the course - everybody made the most of the resources that were available. There was no grumbling about slow computers, or flickering, small screens. Instead

it was readily apparent that the Nepali scientists really appreciated interaction from outside, and were making the most of this opportunity. It was a pleasure working with such an enthusiastic group.

The beauty of these international collaborations is that the learning process is a two-way street. Jane and I got an invaluable insight into Nepali culture, ate a record number of dal bhats, and enjoyed tasting the local bootleg liquor with our course participants after-hours. I was particularly impressed with the diversity of our group - the people there looked like Indians, Chinese, Tibetans, and all mixtures in-between. Everybody got on well, and at the final dinner we were treated to poetry recitations in Farsi, Urdu and Nepali. Lots

of fun and, after such a warm reception, Jane and I are certainly keen to return. I'd recommend it to all of you.



*The first Indian course hard at work at ICRISAT*

### CLIMA TRAVEL AWARDS

CLIMA's Director and the Pasture Legume Program have awarded 5 Travel Top-up Awards to early career CLIMA researchers for visiting laboratories or presenting CLIMA research results at conferences. The successful applicants are listed in the table below.

Applicant	Travel purpose	Funding source	Funding (\$)
Ms Enrica Arlotta	Sponsorship for PhD student from University of Florence to visit CLIMA and study therapeutic value of phytoestrogens in clovers	Pasture Legume Program	1000
Dr John Klingler	To attend the 'XIth International Congress on Molecular Plant-Microbe Interactions' in St. Petersburg, Russia	Director	1000
Mr Graeme Sandral	To collect and conserve perennial legume germplasm (seed and rhizobium) found in Cape Verde	Pasture Legume Program	1500
Dr Fucheng Shan	To attend '5 <sup>th</sup> European Conference on Grain Legumes' and '2 <sup>nd</sup> International Conference on Legume Genomics and Genetics	Director	1000
Ms Sharon Dawson	To attend and present lucerne research and extension outcomes at the inaugural 'Australian Farming Systems Conference'	Director	1000

## CLIMA INDUSTRY INFORMATION FORUM

by Dr Debbie Thackray

On Thursday 10 April 2003, CLIMA hosted an Industry Information Morning, which was convened by Mr Rory Coffey on behalf of the CLIMA Industry Advisory Group. The invited participants included industry members from small to medium-sized businesses and CLIMA Program Management Team.

The aim of the meeting was to:

- inform industry members of current CLIMA activities and objectives
- discuss issues facing development of the grain and pasture legume industry in the future
- investigate the potential for collaborative projects between industry and CLIMA

Presentations were made by both CLIMA and industry members and we were delighted with the interaction that took place throughout the morning, leading to some important outcomes. A summary follows:

#### **CLIMA research and collaboration:**

- CLIMA's vision is to ensure that the Australian legume industry is at the forefront of worldwide developments in research and technology and that our growers and industry remain competitive.

- CLIMA has strong industry links and is keen to expand and diversify its R&D activities and funding sources and to involve industry in guiding its R&D directions.
- CLIMA provides the opportunity for developing specific projects to suit smaller businesses.
- Contribution to research can be in-kind.
- ARC linkage grants provide funding if an industry partner is involved.
- CLIMA can bring businesses together for a private agreement. E.g. giving each a percentage of the product royalties.
- Confidentiality of any agreement will be maintained with individual projects and partners.

#### **Industry Issues:**

- Farmers are profit driven and need sustainable legumes, with yield still considered the foremost driver.
- If yield reliability improved, the area under legume production would increase.
- Growers and marketers must consider other aspects of the crop to improve profitability. E.g. legume by-products (such as lupin pod wall pellets), quality issues, alternatives such as nutraceuticals, etc.

- Take advantage of opening markets, e.g. restrictions following BSE and avoidance of transgenic soybeans.
- We must not separate the needs of the grower and the market when looking at specialised areas.
- A mixture of broadacre and niche farming helps spread risk.
- Most legumes are only suitable for certain soil types e.g. Lupins best on low pH coarse textured soils. NB. Maps based on GIS information can now be generated to indicate where best to grow different legumes.
- Problems develop when niche species are sold on a broad basis and grown where they shouldn't be.
- There is an evolving process to get private sector investment right, with user pays etc.

A model is needed for investment, which gives private sector the confidence to invest in longer-term work, and allows investors to see what the likely returns will be from funding a particular part of the process.

## GROWER GROUP ALLIANCE LINKS RESEARCHERS AND GROWERS

by Ms Tracey Gianatti

February saw the official launch of the Grower Group Alliance, a new grower group initiative supported by the GRDC which links WA grower groups with CLIMA and other research institutions.

The Grower Group Alliance aims to connect grower groups, researchers and the grains industry in a network across Western Australia. By working in partnership with researchers and industry, the Alliance will enhance the opportunities for joint action and cooperation between its members.

Key goals of the Alliance for its first two years of operation are:

1. To establish a formal communication network between growers, researchers and the grains industry;
2. To develop collaborative projects with researchers and industry, based on key research issues identified by growers.

The Grower Group Alliance offers grower groups the opportunity to exchange information, share ideas, and participate in research projects with state-wide significance. The structure of the Alliance allows each group to maintain their local focus, yet also operate with enough 'critical mass' to take action together on issues they would not have been able to do individually.

Researchers will benefit from the Alliance through greater input from growers when setting research priorities, and improved opportunities to field-test new technologies.

The two-year project is co-ordinated by Tracey Gianatti, who is based at the University of Western Australia, in the School of Agricultural and Resource Economics. You can contact Tracey at [gianatt@agric.uwa.edu.au](mailto:gianatt@agric.uwa.edu.au) or (08) 9380 3410.

More information on the Grower Group Alliance can be obtained from the following website:

[www.grdc.com.augrowers/gga/index.htm](http://www.grdc.com.augrowers/gga/index.htm)



From left to right

Ms Tracey Gianatti, Mr Cameron Weeks (Manager Mingenew-Irwin Group) and Professor Lyn Abbott (University of Western Australia).



*Working in partnership  
with researchers and industry*

## NATIONAL LANDCARERS EMBRACE DARWIN

by Ms Sharon Dawson

The 2003 National Landcare Conference was hosted by the NT Government and Tropical Savannas CRC from 28 April to 2 May in Darwin. The program addressed the unique issues of northern Australia including indigenous landcare, diversity of culture, managing remote land and ecotourism, although the audience was largely comprised of NSW and Victorian facilitators concerned about post-National Heritage Trust (NHT) funding arrangements.

The plenary sessions included three speakers who set the scene for discussion of the environment in which landcare is operating today. Em. Prof. Brian Roberts (USQ) spoke about "Land ethics", Mr Michael Taylor (Agriculture, Fisheries and Forestry Australia - AFFA) confirmed that formal involvement in landcare has exploded from 200 local groups in 1990, to 4500 groups today, which involve 40% of Australian farmers, and Ms Tricia Caswell (Royal Melbourne Institute of Technology) noted that Australia is a leader in national landcare programs, being one of only 4 countries in the world with an organised movement. All three speakers recognised that individual farmers have borne too much public good cost to date, and ethically and economically there should be a cost-sharing system. Future actions will require more recognition of volunteers, promotion of successes, and pressure for private industry investment.

With growing competition in the international market place and emphasis on certification of product quality through Quality Assurance (QA) programs, a series of

speakers discussed models for incorporating landcare and environmentally responsible production into QA processes. Ms Dianne Dean (AFFA) recognised that Australia has an opportunity to differentiate its products based on 'clean & green' production, by incorporating an Environmental Management System (EMS) into the farm business plan. This systematic approach to management can



complement existing QA systems relating to the quality of the end product, by identifying and addressing key environmental risks in the production chain. Put simply, QA ensures product quality; EMS ensures process quality.

AFFA has funded 15 pilot studies, including WA's Mingenew-Irwin Group, to develop an EMS for dryland cropping systems, and the Blackwood Basin Group in the south-west for a wider study of broadacre cropping, grazing and viticulture. Ideally, individual EMSs within a group should be linked to provide a common outcome on a large scale, and a system to do this, the Australian Landcare Management System (ALMS) model, was discussed by Queensland producer Mr Jock Douglas. While some growers expressed concern at the current lack of market response to environmentally differentiated products, there is no doubt that EMS is maturing beyond the enterprise level to both regional plans and industries through Best Management Practices (BMPs) and Codes of Conduct. With environmental concern becoming part of the world's values, there can be some confidence in these processes paving the way to market benefits.

*A fuller description of the conference can be obtained from Sharon Dawson*

## NEW APPOINTMENTS

**New Pasture Lecture at UWA**

Dr Megan Ryan has been appointed as the new lecturer in pasture science at UWA. Megan will split her time between the CRC for Plant Based Management of Dryland Salinity and the School of Plant Biology, where she will be teaching the fourth year Pasture Science unit in second semester this year. The position has been externally funded by a number of funding bodies and a private farmer from Albany, Frank Ford. One of the issues which Megan will be addressing, with the aid of PhD student Mr Tim Scanlon, is the perceived decline of pasture health in southern WA. Megan will also be involved in annual pasture legume research projects at CLIMA.



*Dr Megan Ryan, the new pasture science lecturer at UWA*

Megan completed a PhD in ecology on phosphorus cycling on organic/biodynamic and conventional farms (irrigated dairy pastures and dryland wheat) at The Australian National University in Canberra in 1997. This project had an emphasis on arbuscular mycorrhizal fungi and crop and pasture nutrition and growth. Since then, Megan has been employed as a postdoctoral fellow at CSIRO Plant Industry in Canberra, working on impacts of canola on following cereal crops in terms of root disease and mycorrhizal colonisation levels, and the effects of these fungi on wheat nutrition and growth, and crop nutrition (especially zinc). A surprising finding was a parasitic impact from mycorrhizas on winter-sown crops in southern NSW and Victoria. Megan has also been conducting some smaller scale research on mycorrhizas using cryo-SEM and X-ray microanalysis, which has allowed, for the first time, measurement of the concentration of phosphorus and other nutrients, inside individual mycorrhizal hyphae within a root.

**Kioumars Ghamkhar to join the pasture team**

by Dr Sarita Bennett

Some collections of pasture species have now become so large that screening the whole collection for particular desired traits has become prohibitive. The aim of developing a core collection from large collections is to reduce the number of accessions to be screened, but at the same time ensuring that the diversity of the whole collection is included in the

core collection. If the desired trait is found within the core collection, then other accessions from the same region, climate-type or habitat can also be screened.

Kioumars has been working on his PhD at the Royal Botanic Gardens in Sydney for the last three years. Prior to this, he worked at the Australian Museum as a technical officer in the Evolutionary Biology Unit. Before coming to Australia, he was a lecturer at the University of Shahrekord (Iran), the University's herbarium curator, and manager of three different biology labs. He also launched a regional Medicago lab with his colleagues following his Masters project on "Systematics and Biosystematics of the genus Medicago L. in Iran" undertaken at the University of Isfahan (Iran). Furthermore, Kioumars has some experience with the Iranian Environment Protection Organisation as a member of an environmental research group.



*Mr Richard Snowball (DAWA), Mr Kioumars Ghamkhar (CLIMA) and Dr Sarita Bennett (CLIMA)*

## CLIMA RESEARCH PUBLICATIONS 2003

The complete list of CLIMA 2001-2002 publications is currently available in the CLIMA Biennial Report (Hard copies available at CLIMA or PDF copies available on the CLIMA website). The following refereed journal papers have been published since the start of 2003, by CLIMA researchers and associates. The list will be made available on the CLIMA website soon.

**Berger, J., Abbo, S., and Turner, N.C.** (2003). Plant Genetic Resources. Ecogeography of Annual Wild Cicer Species: The Poor State of the World Collection. *Crop Science*, 43: 1076-1090.

**Berger, J.D., Robertson, L.D. and Cocks, P.S.** (2003). Agricultural potential of Mediterranean grain and forage legumes: 2) Antinutritional factor concentrations in the genus *Vicia*. *Genetic Resources and Crop Evolution*, 50: 201-212.

**Croser, J., Ahmad, F., Clarke, H. and Siddique, K.H.M.** (2003). Utilisation of wild Cicer in chickpea improvement – progress, constraints and prospects. *Australian Journal of Agricultural Research*, 54: 429-444.

**Croser, J.S., Clarke, H.J., Siddique, K.H.M. and Khan, T.N.** (2003). Low-Temperature Stress: Implications for Chickpea (*Cicer arietinum* L.) Improvement. *Critical Reviews in Plant Sciences*, 22(2): 185-219.

**Dunbabin, V., Diggle, A. and Rengel Z.** (2003). Is there an optimal root architecture for nitrate capture in leaching environments? *Plant, Cell and Environment*, 26: 835-844.

**Leport, L., Turner, N.C., French, R.J., Thomson, B.D. and Siddique, K.H.M.** (2003). Physiological responses of cool-season grain legumes to drought in the low rainfall mediterranean environment of south-western Australia. In: 'Management of Agricultural Drought'. (ed. N.P Saxena) Science Publishers, Enfield (NH) USA pp. 163-172.

**Mohapatra, P.K., Turner, N.C. and Siddique, K.H.M.** (2003). Assimilate partitioning in chickpea (*Cicer arietinum* L.) in drought-prone environments. In: 'Management of Agricultural Drought'. (ed. N.P Saxena) Science Publishers, Enfield (NH) USA pp. 173-188.

**Regan, K.L., Siddique, K.H.M. and Martin, L.D.** (2003). Response of kabuli chickpea (*Cicer arietinum* L.) to sowing rate in Mediterranean – type environments of south-western Australia. *Australian Journal of Experimental Agriculture*, 43: 87-97.

**Si, P., Mailer, R.J., Galwey, N. and Turner, D.W.** (2003) Influence of genotype and environment on oil and protein concentrations of canola (*Brassica napus* L.) grown across southern

Australia. *Australian Journal of Agricultural Research*, 54: 397-407.

**Siddique, K.H.M., Loss, S.P. and Thomson, B.D.** (2003). Cool season grain legumes in dryland Mediterranean environments of Western Australia: significance of early flowering. In: 'Management of Agricultural Drought'. (ed. N.P Saxena) Science Publishers, Enfield (NH) USA pp. 151-161.

**Turner, N.C., Wright, G.C. and Siddique, K.H.M.** (2003). Adaptation of grain legumes to water-limited environments: Selection for physiological, biochemical and yield component characteristics for improved drought resistance. In: 'Management of Agricultural Drought'. (ed. N.P Saxena) Science Publishers, Enfield (NH) USA pp. 43-80.

If you are a CLIMA researcher or associate and your paper isn't listed here, please forward 2 hard copies of your publication to Professor Kadambot Siddique (see newsletter credits for CLIMA address). We also encourage all CLIMA staff and associates to do this for all future refereed and published journal papers, conference papers and book chapters.

## WHAT'S NEW ON THE CLIMA WEBSITE

- Five **new media** releases “Industry invited to ‘drive’ to the future”, “Beyond the grey unknown”, “Resistance straining”, “Anthracnose marked” and “Muscling up legumes” (go to News page!)
- **Seminar** speakers and topics have now been updated until December (go to News page!)
- **The CLIMA Biennial Report 2001-2002** is completed and available on the website (go to ‘Information for CLIMA staff & students, collaborating researchers, or industry’ to access link in left margin)
- New **links** to:
  - Young Australian Rural Network:**  
<http://www.yarn.gov.au>  
- an interactive website designed for young people in rural industries
  - Lupin aphid and virus information:**  
<http://www.agric.wa.gov.au/lupinvirus>  
- includes a decision support system for growers and advisers for control of aphids and viruses in lupins

## BABY NEWS

Sarita Bennett and Dorian Moro became the proud parents of Justin Evan Moro on 19th December 2002, weighing 2.75kg. Justin arrived not a day too late as South Perth Community Hospital's Maternity Unit closed it's doors on the 20th December, and Sarita was very pleased not to have to find an alternative hospital at short notice.



Susan Barker and Ben also added second baby girl Tamsin to the family. Susan promised us a picture for the next newsletter.

## NEW LUPIN WEBSITE

[www.agric.wa.gov.au/lupinvirus](http://www.agric.wa.gov.au/lupinvirus)

A “Decision Support Website for Virus and Aphids in Lupins” has been developed by Dr Debbie Thackray with Grains Research and Development Corporation (GRDC) funding through CLIMA. It provides valuable information on cucumber mosaic virus (CMV) and its aphid vectors in lupin, including background information on CMV and aphids, current management recommendations, and photographs of aphids and virus symptoms. It also presents maps of yield loss risk for different sowing date and seed infection scenarios in the current-year, based on predictions from a model forecasting aphid outbreaks and CMV epidemics in lupin crops in different zones of the WA grainbelt. Information on bean yellow mosaic virus (BYMV) will be added in the near future.

The website provides a helpful tool for development officers, consultants, advisers and growers in their decision-making over management of aphids and virus, including cultural control of virus spread and correct targeting of insecticides to control aphid feeding damage in lupins. Further information on the website and risk predictions can be obtained from

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Volume 4, Number 2; July 2003

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