



## CLIMA set to continue as a University Research Centre

The Cooperative Research Centre for Legumes in Mediterranean Agriculture (CLIMA) was a productive cooperative venture between four partners (AGWEST, UWA, CSIRO, Murdoch University) over the period 1992-2000. CLIMA also involved successful collaboration with many interstate and international organisations.

Under the leadership of CLIMA Director, Adj/Prof Mike Ewing, CLIMA Associates (AGWEST, UWA, CSIRO and Murdoch University) have signed a Memorandum of Understanding to enable CLIMA to continue as a centre based at The University of Western



Australia. The management structure of CLIMA will consist of the Director, a Scientific Committee and an Advisory Committee.

Continuing collaboration under the CLIMA umbrella recognises the special importance of crop and pasture legumes as contributors to profitable and sustainable farming systems in Australia, and of the problems of growing legumes in infertile soils in low input systems on farms.

The Memorandum of Understanding for CLIMA will remain in force for five years from July 1, 2000. Continuation of the Centre will be by mutual agreement of all parties.

Given the many successes of working together over the last eight years, the CLIMA partners see much merit in continuing their collaborative relationships beyond the conclusion of the CRC period. The aims of doing so are to:

1. conduct mutually beneficial research, development, training and related activities directed toward the following key objectives:

- to increase farm productivity through the use of legumes;
- to increase the sustainability of legume-based farming systems;
- to increase the skills of legume scientists and knowledge of legume science in industry and the broader community;
- to broaden the funding base available to CLIMA and its Associates.

2. create an environment where the impact of the CLIMA Associates working together is greater than what would be achieved if they proceeded independently.

### Commitment to Cooperation

Recognising that the four organisations have complementary knowledge, skills and resources to undertake legume research and development, the CLIMA Associates will jointly and/or separately progress these aims by means including but not limited to the following:

1. Share knowledge and expertise on legume science and technology, as well as knowledge about legume industry developments and priorities.
2. Collaborate in the process of strategic planning for legume research, including early identification of

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## Breakthrough in Molecular Marker Technology

Drs. Huanan Yang and Penny Smith have announced a breakthrough in their development of a new technique that could improve the efficiency of molecular markers in plant breeding. The new technique offers a better method for finding markers for important genes such as the gene for anthracnose resistance in lupins. The molecular markers will speed up the selection of genotypes with that gene.

The method is 'Microsatellite-Anchored Fragment Length Polymorphisms' or MFLP. MFLP is a more rapid method for finding the unique DNA fingerprint and will also improve the efficiency of discovering codominant, locus-specific markers for molecular mapping.

The breakthrough came on a GRDC project supervised by Associate Professor Wallace Cowling of UWA. The GRDC project funds CLIMA researcher Dr. Yang whose revolutionary technique is valuable not only for legume breeding but for all plant or animal improvement programs.

### Workshops

#### August 31st

##### • CLIMA, Where to Now?

The workshop will highlight some of the achievements of CLIMA during its 8 year life as a CRC, but will focus mainly on the future. People should register for the workshop by sending an email to Dr. Nancy Longnecker.

longneck@cyllene.uwa.edu.au

#### Ongoing

##### • Agriculture and Gene Technology - The Bread and Butter Issues!

These half-day workshops conducted by researchers from CLIMA and AGWEST are designed for presentation in regional centres throughout Western Australia. For more information, contact Dr. Jane Gibbs. djgibbs@cyllene.uwa.edu.au

## Message From The Director

This newsletter marks an important turning point for CLIMA, the transition from a Cooperative Research Centre to a collaborative centre based at The University of Western Australia. We hope that during this change we are able to maintain the ingredients that made CLIMA such a vital component of the agricultural R&D landscape in Australia. The strength of CLIMA has been its capacity to rapidly bring together collaborators from a wide range of backgrounds, scientific interests and institutions to focus on problems constraining profitable and sustainable agriculture.



Past successes have resulted from the efforts of many individuals; seconded scientists, CLIMA employees, project level collaborators, industry supporters and farmers. I would like to draw attention to the role of the Board of CLIMA through the Centre's 8 year history in providing clear strategic direction and the role of the Executive Committee in maintaining a balance between the needs of CLIMA and its collaborating partners. The Sub-Program Leaders largely undertook operational management and coordination of this complex entity. Their consistent commitment, inspiration and belief in their roles was central to the success of CLIMA.

I would like to pay tribute to all those who have contributed to CLIMA. The conditions that gave rise to the need for CLIMA remain as relevant today as they were a decade ago when the initial concept was being developed meaning that there is great incentive to maintain the momentum and opportunity that has been created. We look forward to continuing support and involvement from all those that have contributed to date and more.

**Adj/Prof Mike Ewing**

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problems, and in establishing priorities for research and development for legumes.

3. Respect the sovereignty and intellectual property of others.
4. Develop Centre projects on a project by project basis, and negotiate support from some or all CLIMA Associates on the basis of mutual self interest.
5. Share and make facilities available across the alliance within a framework established in project bids.
6. Encourage the development of applications for external research grants where skills can be brought together to enhance the impact of the project and the chances of success of the bid.
7. Share knowledge of national and international developments in legume science, and linkages with relevant national and international agencies.
8. Share opportunities with other CLIMA Associates when one party is approached but does not have the skills to pursue the opportunity itself.
9. Pursue opportunities associated with the positive perception of the CLIMA name, particularly in the international arena.
10. Encourage co-supervision of students.
11. Run a joint seminar program in legume science.
12. Encourage a coordinated approach to delivery of results to industry, and jointly conduct one significant event in legume science, market development or communication each year in August.
13. Promote the value of CLIMA to the external world as having national and

international capacity to carry out excellent legume crop and pasture research, development, education and training.

### “Continuing collaboration recognises the special importance of crop and pasture legumes”

CLIMA Projects will include all collaborative projects involving legumes developed by two or more of the CLIMA Associates and undertaken under the name of CLIMA.

#### Administrative Structure

The normal policy of The University of Western Australia will be to administer and take formal responsibility for ‘CLIMA projects’ to ensure that all contractual obligations to external funding bodies are satisfied. Where appropriate, the management of projects will be undertaken in collaboration with Chief Investigators from CLIMA Associates. Management of CLIMA projects can be undertaken either by the UWA Centre or any of the Associates.

#### Location of Activities

The University of Western Australia will provide access to premises and facilities for CLIMA on the Crawley campus. Other activities shall be conducted at appropriate locations determined on a project-by-project basis.

The Scientific Committee (which will include representatives from the Associates) will work with Adj/Prof Mike Ewing to develop new initiatives and work with the industry to tackle key problems.

Researchers with interest in developing CLIMA projects should discuss their ideas with Mike Ewing.

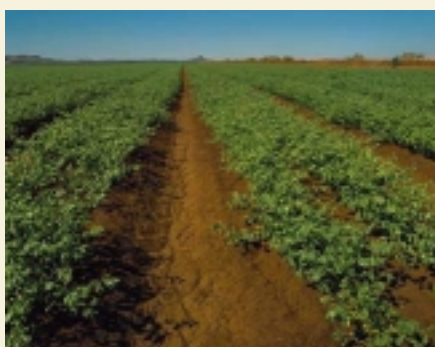
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# New Chickpea Germplasm Offers Hope

• by Diana Wolfe,  
Wolf Words, Melbourne

Threats to the future of Australia's \$80 million-a-year chickpea industry from a devastating fungal disease may be averted by international research collaboration.

A collaborative disease screening and crop improvement venture between Australia, Syria and Turkey aims to find solutions to the chickpea industry's greatest threat – Ascochyta blight.



Principal Research Scientist with Agriculture Western Australia and the Centre for Legumes in Mediterranean Agriculture (CLIMA) in Perth, Dr Kadambot Siddique, has taken on screening for Ascochyta as one of his primary projects. He hopes the venture will improve chickpea varieties, increasing productivity and disease-resistance.

Dr Siddique has just returned from Turkey, with promising results. "We're delighted to report that 57 potential new lines of chickpeas with good Ascochyta resistance have been identified in the latest in a series of collaborative experiments based in Turkey," he said.

Ascochyta was first reported in Australia in 1975. No further reports of the disease were made until 1996 in SA. From then, it has spread rapidly to Victoria, NSW, WA and Queensland, and now constitutes a major threat to chickpea production and viability.

Production losses of up to 40% are common. In Victoria alone, plantings have declined from 80,000 hectares to around 15,000 hectares, as farmers

struggle to maintain crop quality due to the disease.

Ascochyta represents a significant threat to Australia's 200,000 tonne chickpea industry. The industry was virtually non-existent up until the first variety, Tyson, was released in 1978, and has grown rapidly over the past 20 years.

The majority of Australian chickpeas (desi types) are exported to the Indian subcontinent and the Middle East. They are split for Dhal or made into flour (besan).

The Australian industry is at a cross road due to this disease threat. Farmers are reluctant to plant chickpeas if they are losing yield, however, in some areas no other legumes can be planted, leaving them few options.

Funded by the Grains Research and Development Corporation (GRDC), Dr Siddique's project started in 1997, when reports of the disease were just appearing.

Other research groups involved in the project are the International Centre for Agricultural Research in Dry Areas (ICARDA) and the Aegean Agricultural Research Institute (AARI) at Izmir, Turkey. These organisations have been breeding chickpeas for disease resistance for more than 15 years.

Due to similarities between the Turkish and Australian climate, collaborative experiments have been conducted to test plants for disease.

In experiments using plants from different countries, all three Australian standard kabuli chickpea varieties (Kaniva, Garnet and Bumper) were wiped out by disease. So far, three sets of disease screening experiments have been conducted including Australian varieties.

The first experiment, in 1997-98, involved 1500 lines. Of these, 202 resistant lines were selected, brought back to Australia and grown in

quarantine. Last March, these were planted in the field in small plots in WA, NSW, SA and VIC. Many lines showed superior disease resistance similar to that observed in Turkey in 1997-98, confirming the reliability of the screening technique used in Turkey. Results showed many lines had excellent resistance to the disease. The national chickpea-breeding program has started crossing superior lines from this project with standard Australian varieties to transfer the resistance.

**“57 new lines with good Ascochyta resistance have been identified”**

Because of the expense of testing more than 2000 chickpea lines in Australia, the combined project will allow for more extensive and comprehensive research than ever before. The research will also test a variety of conditions. Screening in Turkey is being done under natural disease pressure so results should be inclusive.

During 1998-99, 89 lines selected from the second Turkish experiments were grown under quarantine at the South Australian Research and Development Institute (SARDI), and will be available for field testing this season. The third and final set of experiments involves 200 new lines. Dr Siddique was able to select 57 superior lines from this experiment during his visit to Turkey.

This project, through the nationally coordinated chickpea breeding program, will benefit all Australian chickpea growing regions, and is one of many approaches to the problem currently underway. Each state has its own program to improve chickpeas. It is likely one or two superior lines identified in this project could be directly released for commercial production within the next four years, after further field testing and seed multiplication. Scientists are confident the disease can be tackled and Australia's chickpea industry can continue to grow and expand.

## Massive Nitrogen Fixation Observed

• by John Pate

A study of nitrogen fixation by the fodder tree legume tagasaste (*Chamaecytisus proliferus*) has just been completed and will appear in an issue of the Australian Journal of Plant Physiology towards the end of the year. Murray Unkovich, John Pate, Ted Lefroy and David Arthur followed the nitrogen economy of alleys and plantation of tagasaste cut when four years old and allowed to coppice ungrazed for a two year period.

The study site was on deep sand at Moora in Western Australia and trees had free access to non saline ground



water at five metre depth. Trees were found to depend on nitrogen fixation for over 80% of their nitrogen requirement. Averaged over two years of regrowth alley trees (550 trees per hectare) fixed 83 kg N hectares per year while plantation trees (2330 trees/hectare) fixed 390kg N per year. In the second year after cutting plantation trees fixed almost 600 kg N per hectare. This is a value close to the maximum ever recorded for any legume system and is 3-5 times that expected of pasture or grain legume crops in the study region.

A parallel study of water use by the plantation indicated that they used the equivalent of twice the rainfall received during the study period. Plantings of tagasaste would therefore be likely to impact significantly in controlling rising water tables in the region.

## CLIMA Continues to Attract Visitors

Visitors who have come to CLIMA for at least three months are listed here, together with their research interests and local hosts.

Dr Narendra Singh  
Indian Institute of Pulses Research,  
Kanpur, India  
March -June 2000  
Molecular markers for drought resistance.  
Drs Rob Potter & Neil Turner  
SABC, Murdoch University

Dr Sunita Kumari  
Indian Agricultural Research Institute,  
New Delhi, India  
June - Nov 2000  
Physiological mechanisms of drought  
resistance in chickpea.  
Dr Neil Turner, CSIRO Plant Industry

Dr. Antonio Barbera  
University of Catania, Italy  
June - Sept, 2000  
Nitrogen fixation of legumes.  
Dr. Ian Fillery, CSIRO

Mr Mohamed Ali Afzal  
Bangladesh Agricultural Research Inst.  
1 Aug- 30 Oct, 2000  
Pulse breeding and seed production.  
Dr. KHM Siddique, Agriculture WA

Dr. Long Li - lli@agric.uwa.edu.au  
Chinese Academy of Sciences, Beijing.  
Feb - Oct, 2000  
Intercropping chickpea and wheat.  
Prof Zed Rengel SSPN, UWA  
(08) 9380 1713

Dr. Jianbo Shen - jshen@agric.uwa.edu.au  
Agricultural University, Beijing  
Feb - Oct, 2000  
Root exudation of white lupin.  
Prof Zed Rengel SSPN, UWA  
(08) 9380 1713

Assoc Prof Yuchuan Ding  
yding@agric.uwa.edu.au  
Shanxi Academy of Agricultural  
Science, China  
Feb - Oct, 2000  
Transport of manganese into lupin grain.  
Prof Zed Rengel SSPN, UWA  
(08) 9380 1713

Dr. Constantino Caminero  
Agriculture Research and Technology  
Centre, Castillay Leon, Spain  
May to July 2000  
Molecular marker use in pulse breeding.  
Dr. Clive Francis, CLIMA UWA

Mr. Benedetto Ballatore  
University of Palermo, Italy  
Nitrogen fixation of legumes  
particularly sulla.  
January to December 2000  
Professor John Pate, UWA

Dr. Lincoln Zotarelli  
May - Nov, 2000  
Dr. Ian Fillery CSIRO



Pictured in the office of the great N I Vavilov, father of modern plant genetic resources, are (from left to right) John Cullen, GRDC; Dr Colin Piggin, ACIAR; Dr Tony Fischer, ACIAR/GRDC; Prof Clive Francis, CLIMA; Dr Michael Mackay, Curator National Cereals Collection, NSW and Dr Ken Street, CLIMA/ICARDA (GRDC funded).

A team visited St Petersburg to review progress of CLIMA's GRDC-funded initiative which facilitates movement of pulse and cereal germplasm from the Vavilov collection via ICARDA and ultimately into Australian collections. Russian scientists have the opportunity of working at ICARDA and developing the data base and seed supplies for their Institute using project funds.

# New CRC Bids go to Canberra for Consideration

CLIMA based researchers have been heavily involved in incorporating aspects of legume research into two bids for new Cooperative Research Centres (CRCs). Proposals have gone to Canberra for a CRC for Plant-based Management of Dryland Salinity and a CRC for Profitable Pulse Production. Both bids incorporate and develop on components of R&D undertaken as part of CLIMA's portfolio but their overall direction and focus is such that neither can be thought of as continuations of CLIMA.

## • CRC for Profitable Pulse Production Bid

A proposal for a new CRC for Profitable Pulse Production was lodged in Canberra this month. The bid combines the expertise of researchers at The University of Western Australia, The University of Melbourne, The University of Adelaide, Murdoch University, AGWEST, SARDI, Victoria's Department of Natural Resources and Environment, and New South Wales Agriculture. The Council of Grain Grower Organisations is also a key player in the initiative.

Dr. Mark Sweetingham, AGWEST's Principle Plant Pathologist, led the development of the CRC proposal which



targets disease and grain quality of pulse crops. Mark says that he received invaluable assistance in developing the bid from Dr. Jane Gibbs and researchers in all of the partner organisations.

The pulse industry in Australia has a current annual production of 2 million tonnes with a gross value of \$500 million. Pulses contribute an additional \$600 million to the grains industry through their benefits in crop rotations.

Dr. Sweetingham said that growers have lost confidence in pulse crops in recent years because of outbreaks of disease and low grain value. Both of these constraints would be addressed in the new CRC and the new opportunities would likely double the national value of the pulse industry within 12 years. Failure to act could see Australia's pulse production recede well below its current value, with negative flow-on effects to the grains industry through loss of rotational benefits.

## “critical areas include cutting edge technologies for pulse breeding for disease resistance and grain quality”

The critical areas for research and development include integrated disease management systems, product value and the use of novel genes and cutting edge technologies for pulse breeding for improved disease resistance and grain quality.

Industry and grower groups such as GRDC, Pulse Australia and nation-wide 'Shared Solution Groups' will play key roles in transfer and adoption of the CRC's research. Dr. Sweetingham said that a CRC, with its ability to focus across state boundaries to bring together industry and researchers, is the best way to achieve the vision of a sustainable \$1 billion pulse industry by 2012.

## • CRC for Plant-based Management of Dryland Salinity Bid

Everyone is aware of the huge challenge of salinity which Australia faces. A group of researchers headed by Professor Phil Cocks has submitted a proposal for a CRC for Plant-based Management of Dryland Salinity to tackle some of the issues. The main objective of the Salinity CRC is to

manage water in the landscape through profitable farming systems based on perennial plants.



The organisations which make up the core partners for the Salinity CRC are The University of Western Australia, AGWEST, Charles Sturt University, CSIRO, Conservation and Land Management WA, Victoria's Department of Natural Resources and Environment, New South Wales Agriculture, Primary Industries and Resources of SA and The University of South Australia. Support will also come from GRDC, the National Dryland Salinity Program, Wesfarmers Dalgety and WA's Department of Commerce and Trade.

The Salinity CRC aims to understand the function and structure of natural and agro-ecosystems and to use this understanding to select woody and herbaceous plants for perennial plant-based farming systems. Farming systems that reduce ground water and, where necessary, tolerate waterlogging and salinity will be developed, tested and demonstrated. Off-site effects of the new farming systems will be quantified. Policy options will be developed which are based on understanding the socio-economic constraints which impact adoption of new farming technologies.

With these aims, it is envisaged that the CRC will have an enduring impact on the future of Australian agriculture and its capacity to maintain the nation's natural resources. The research will provide new plant-based land use systems that lessen the economic, environmental and social impacts of dryland salinity and thereby will help to sustain rural communities.

## Postcard from DuPont

I left the Gene Transfer Laboratories at CLIMA in December, 1999. I have settled in Newark Delaware, USA where I have continued to work in the transformation area within the Nutrition and Health Division of the DuPont Company.

In my first assignment I was appointed Research Supervisor - Transformation with responsibility for the corn and soybean transformation facility in Newark. Recently my responsibilities have expanded to include transformation groups in Des Moines, Iowa and in the UK.

The past six months have been full of learning experiences that range from dealing with driving in a foot of snow on my arrival to understanding several new transformation systems. I have been very fortunate to have had wonderful support from my friends at CLIMA, my new colleagues and most of all from my family.



Recent visits from Peter Langridge and John Hamblin and my daughter Alexis have helped to keep me in touch with what is happening in Australia. I have two "Bean there done that" CLIMA mugs on my desk.

I can assure everyone that having been part of CLIMA was wonderful preparation for the exciting work I am doing now.

**Dr Joanne Barton**  
Newark, Delaware, USA

## A Rainy Winter Warmer

**Lentil Tom Kha Soup** - This delicious soup, developed by Jon Clements, is based on a Thai-style tom kha. Jon incorporated Australian-grown lentils, which he says are the best in the world. After tasting his soup, we wouldn't argue.



**Total preparation time 35 minutes**

**Hands-On 15min**

**Hands-Free 20 min Serves 4-6**

*Recipe tips: If using fresh mushrooms rather than dried, add with fish sauce. Galangal is a root crop that can be found in Asian food stores, or it may be substituted with ginger.*

1 1/2 cups split red lentils  
1.5 L chicken or fish stock  
6 dried shiitake mushrooms  
10 (1cm long) pieces lemon grass, bruised to release flavour  
1/4 cup galangal, sliced thinly  
1/2 cup fresh coriander leaves, chopped (reserve some for garnish)  
4 tbsp fish sauce (or to taste)  
1-2 tbsp lime juice  
800ml coconut milk  
1/4 tsp chilli powder (more if desired)  
1/4 tsp cracked pepper  
Salt

Rinse lentils. Put in large pot with stock, mushrooms and lemon grass. Bring to the boil; simmer for 10 minutes.  
Retrieve softened mushrooms from soup, with a little of the broth, and puree in a blender.  
Add galangal, coriander and mushrooms to pot.  
Add fish sauce, lime juice, coconut milk and chilli. Bring to the boil; simmer for about 5 minutes.  
Remove lemon grass. Add cracked pepper and salt to taste.  
Garnish with a few leaves of coriander.

## Newsletter Credits

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## Something in the Water?

2000 has seen a number of additions to staff families. Emily Rose Murphy was born to Debbie Thackray and Kevin Murphy on 19 January, Emma Liisa Kuparinen was born to Nancy Longnecker and Raimo Kuparinen on 28 January and Jacqueline Ann Clements was born to Dawn and Jon Clements on 25 April.



pictured clockwise from top left are: Emily Murphy, Emma Kuparinen, Jacqueline and David Clements.