



*Benefiting  
industry  
through  
improved  
tools for  
plant  
breeding*

**CONTACT**

Sharon Behen

Waite Campus  
Adelaide University  
Glen Osmond  
Adelaide 5064

Tel 61 8 8303 6539

Fax 61 8 8303 6789

**Email**

crcmpb@waite.adelaide.edu.au

**Website**

www.molecularplantbreeding.com

**Cooperative  
Research  
Centre  
Molecular  
Plant  
Breeding**



## REFLECT – REGROUP – RENEW

### CRCMPB Annual Research Meeting

Reflect, Regroup and Renew was the theme for the recent CRCMPB Annual Research Meeting held in the Barossa Valley in South Australia.

Director, Bryan Whan, said the 3-day meeting was a great opportunity for more than 100 CRC collaborators to get together to reflect on past achievements and focus on future success and outputs.



From left to right: Rob Henry, Brian Hare and Bryan Whan

"There was a common enthusiasm for making the most of the last three years of the centre and looking forward to the possibility of a new CRC," Bryan said.

"It is also the only time in the year that everyone from within Australia and overseas gets to be in the one place, and the exchange of ideas and the opportunity to learn more about each of the research projects is invaluable," he said.



From left to right: Juan-Josè Olivares and Alessandro Pellegrineschi



From left to right: Erica Martin, Dean Podlich, Cherie Bell and Jacinda Rethus

From left to right: Damien Lynch, Donna Glassop and Katherine Guthridge

Formal sessions were held devoted to key projects and research areas, communication, education and developments in intellectual property management and commercialisation.

Craig Cormick from Biotechnology Australia delivered a keynote speech

and provided recent information on public attitudes towards GMOs.

Discussion panels, program meetings and social activities including golf and tennis were other highlights of the meeting.

## From the Director

### Important time ahead for CRC

Our recent Annual Research Meeting gave us the chance to reflect on the past year and regroup for the next. It was a fabulous event and I would like to take the chance to express my appreciation to everyone who helped plan and run the meeting.



What pleased me most was the enthusiasm and commitment shown by everyone involved with the CRC. We had the chance to hear of our success in research and development, contributions made to new knowledge and the outcomes of our projects.

It is important to consolidate on this success as we enter a critical period in the CRC's term. In just over a year we will have our 5-year review, an important opportunity for us to demonstrate what we have achieved and can deliver on in the remainder of our 7-year term.

We have recently restructured our programs to ensure we work strategically towards outcomes and that projects are meeting industry needs. The program management committee is in the process of assessing the projects and outputs in readiness for the 5-year review.

While we must remain focused on our current work in this CRC, it is also time to start thinking about a new Centre. We must notify the CRC Association by February next year of our intention to establish a new CRC and submit our application by July. The Board has approved a process for developing a proposal and this is already being implemented.

The next 12 months will be busy and challenging for us all. We need to keep working on our current aims and goals, while also working towards the goal of securing another CRC term. We have a team of dedicated and skilled people who are up to the challenge and I look forward to progressing and advancing the CRC with your help.

Bryan Whan  
Director

## ABB joins the CRCMPB

ABB Grain Ltd has joined the CRCMPB as a Supporting Participant. It will support three projects over the next three years, with the aim of developing enhanced barley germplasm using new technologies available through the CRCMPB.

ABB will be involved in the following projects:

- Accumulation of disease resistance genes
- Pyramiding of malt quality alleles
- Feed barley conversion

## PhD student Russell McInnes attends national CRC conference

CRCMPB PhD student Russell McInnes recently attended the CRC Association conference in Perth where he was one of only four PhD students to give a research presentation.



Russell McInnes (far right, back row) with other CRC PhD students at the recent CRC Association conference

Eight students were selected from more than 60 Australian CRCs through a formal application process to attend the conference and Russell said it was a fantastic opportunity to see a snapshot of leading Australian science.

"It was rewarding to see that CRCs are delivering social, economic and environmental outcomes for their respective industries and I enjoyed the chance to tell the other delegates a bit about plant biotechnology," Russell said.

His presentation '*Productive pastures and tougher turf*' detailed the use of gene technology in making improvements to the lignin profile of grasses. Lignin is a water-repelling glue found in the walls of certain plant cells and is the main culprit in reducing the nutritional value of pasture grasses and the resilience of turf grasses.

Russell has been working on his PhD titled '*Biosynthesis of lignin in plant cell walls and its manipulation in pasture grasses*' since 1998 and is supervised by Professor German Spangenberg.

His project involves manipulating lignin genes to make more productive pastures or tougher turf. The research team at the Plant Biotechnology Centre, Agriculture Victoria, is currently manipulating the lignin genes in grasses using a 'gene gun'. Gold particles coated with DNA that will turn the genes either on or off are propelled by a blast of high pressure Helium gas into clumps of grass cells. The DNA is tailor-made so that in some cases the outcome will be more productive pastures, and in others it will be tougher turf. Ultimately the research will contribute to a greater understanding of lignin biosynthesis in plants.

In the future Russell is interested in research related to the development of whole-plant in silico simulations. He said he would also be keen to work at the interface between information technology and molecular biology in the rapidly emerging discipline called 'bioinformatics' and would also like to promote wider community understanding of the power of gene technology and the benefits that can be realised through its application.

## Raising the profile of plant research

**The CRCMPB was one of numerous organisations to recently sponsor the 3rd International Conference on Mycorrhizas, held in Adelaide, which attracted about 450 delegates from 48 countries.**

Chair of the Conference Organising Committee Professor Sally Smith, was pivotal in bringing the conference to the southern hemisphere for the first time. She is a CRC researcher as well as Director of the Centre for Plant Root Symbioses and Deputy Head of Adelaide University's Department of Soil and Water.

It was another accomplishment in a long list of recent achievements for Professor Smith who is raising the profile of Australia's research excellence in plant research.

Professor Smith is recognised around the world for her work on mycorrhizas (a beneficial symbiosis between plants and roots and

specialised soil fungi), including her contribution to understanding the processes which form and control the plant-fungi interfaces and the transfer of nutrients between the symbionts.

She was recently awarded the Clarke Medal of the Royal Society of New South Wales for her contribution to Botany, but more importantly was elected as a Fellow of the prestigious Australian Academy of Science.

"It is the highest academic honour in Australia and this year I was the only woman and the only South Australian to be elected," Professor Smith said.

Each year a small group of scientists are selected for excellence in their chosen discipline to become life members of the Academy. It is involved in activities including the promotion of science, sponsoring awards and lobbying governments on science policy.



*Professor Sally Smith played a pivotal role in bringing the 3rd International Conference on Mycorrhizas to Adelaide*

Professor Smith has also been appointed an Honorary Professor at the Research Centre for EcoEnvironmental Sciences (RCEES) at the Chinese Academy of Sciences in Beijing. A Memorandum of Understanding has been signed between Adelaide

University and RCEES to facilitate joint research activities, supervision of students, applications for funding and other interactions. The new links were greatly facilitated by the activities of CRCMPB postdoctoral fellow Dr Yongguan Zhu who has been appointed as a Visiting Research Fellow in the Department of Soil and Water, effective from January 2002, when he joins RCEES.

## Collaboration benefits wheat research

**A collaboration with US giant DuPont Agricultural Biotech is providing CRCMPB researchers with access to the latest technology and extensive database resources to further research outcomes.**

CRCMPB PhD student Tim Sutton has recently returned from a four-week placement at DuPont and said the experience was of great value for his PhD project.



*PhD students Ryan Whitford and Tim Sutton*

"DuPont has an incredible EST (expressed sequence tag) database that has taken them years and millions of dollars to build. The CRC couldn't build such an extensive database so it is more practical to establish a collaboration and be able to access this information," Tim said.

By studying the expression of genes, researchers are gaining a complete picture of wheat and isolating the genes that control various functions. The aim is to identify genes that control chromosome behaviour to help make wheat breeding technologies faster and more effective.

Tim's PhD project is focused on the process of meiosis and identifying genes involved in meiotic processes in the wheat anther. Chromosome pairing, recombination, and the genes that control these functions are of particular

interest. Meiosis is a special type of cell division that generates the cells required for fertilisation and the subsequent production of seed. These cells, otherwise known as gametes, form the pollen and ovaries within the reproductive structure of the plant. Meiosis occupies only a short period of the life cycle of higher plants but is a crucial process which ensures the correct passage and maintenance of genetic information from parent to offspring.

During his stay at DuPont, Tim generated and screened a microarray containing about 2000 wheat genes, looking for candidates associated with meiosis and how their expression in the anther changes from the beginning to the end of the process. His experiments also involved screening for genes differentially expressed between wild type and meiotic mutants of wheat.

He said the ability to use expensive and high-tech equipment, including microarrays, was a highlight of the trip.

"Only a decade ago scientists could only examine expression of small numbers of genes in a single experiment. Using microarrays and other new technologies we can now study thousands at a time which is fast-tracking research discoveries and giving us a greater understanding of plants, including wheat," Tim said.

While there were significant benefits for the CRCMPB from accessing the equipment, Tim said DuPont also benefited.

"DuPont need people from universities and CRCs to offer knowledge of specific biological processes to make best use of their databases and resources," Tim said.

Through the collaboration with DuPont, Tim and fellow PhD student Ryan Whitford both visited the US company last year.

## CIMMYT Visit

Annual meetings will now be held in CIMMYT following a recent trip by Bryan Whan, Ian Atkinson and Peter Langridge. The first has been scheduled for September 24-26 to discuss the involvement of the CIMMYT wheat project in the CRC. A Board meeting will also be held at CIMMYT on August 27-29.

In other CIMMYT news, PhD students Magy Salgado and Juan-Josè Olivares attended the recent Annual Research Meeting and are currently continuing their studies in Adelaide. Magy is in Australia until the end of August and Juan-Josè will return to Mexico at the end of the year.



Pictured at the recent trip to Mexico are (L to R): Manilal William, Bryan Whan, Juan-Josè Olivares and Magy Salgado.

## In Brief

### New web site launched

The CRCMPB's new website at [www.molecularplantbreeding.com](http://www.molecularplantbreeding.com) was launched at the recent Annual Research Meeting. It contains research information, news items, the newsletter, advertised positions, education information and parts of the annual report. Please visit the site and let us know what you think.

### Links with Western Australia strengthened

The Western Node of the CRCMPB has been finalised which will result in greater collaboration between the CRC's western participants. The coordinated effort involving Murdoch University, University of Western Australia and the Department of Agriculture WA will ensure CRC technology is delivered to industry and the efficiency of cereal breeding in the western region is increased. A senior "Leader in Molecular Breeding" will be appointed to lead and supervise the western effort. The CRCMPB and Value Added Wheat CRC (VAWCRC) will collaborate in the area of developing and implementing markers for wheat quality, and the VAWCRC is contributing a Post Doctoral position.

### Student scholarship

The CRCMPB Program Management Committee has approved a scholarship for a student to be located at ICARDA in Syria. The student will be enrolled in Adelaide University and undertake a research project on 'The genetic potential of wild barley (*H.v. ssp. spontaneum*) to improve adaptation to low rainfall environments'.

The student will be supported by Jason Eglington and Steve Jefferies from the Cereal Markers Program.

## Diary Dates

### 10th Australian Barley Technical Symposium 2001:

#### A Barley Odyssey

16-20 September 2001

Rydges (Lakeside) Canberra ACT Australia

Web: [www.abts.asn.au](http://www.abts.asn.au)

Email: [barley@consec.com.au](mailto:barley@consec.com.au)

### Wheat Breeding Society of Australia 10th Australian Wheat Breeding Assembly

16-21 September 2001

Mildura VIC Australia

Phone: 0408 213 450

## Interesting websites.com

### Work

Obviously the new CRCMPB website  
[www.molecularplantbreeding.com](http://www.molecularplantbreeding.com)

The new, improved and dynamic site for the CRC for Molecular Plant Breeding is both useful and informative. Watch for evolving features to the site, updates and information.

### Play – SWISS-QUIZ

[www.expasy.ch/swiss-quiz/](http://www.expasy.ch/swiss-quiz/)

The principle of the Swiss-Quiz is to answer 10 questions chosen randomly from a database of questions related to the fields of molecular biology, biochemistry and genetics. If you obtain a perfect score – and this is no easy task – you will be prompted to enter your name and contact details. Each month two entries with perfect scores are randomly chosen and sent delicious Swiss chocolate. Good luck – the collective minds of the CRCMPB should clean up!

## Puzzling!

If you are looking for yet more mental stimulation, try this puzzle. A square measuring 20cm by 20cm contains one line from the centre of the square to the left hand side – cutting the edge 7cm from the top. Divide the square into 5 areas of equal area, using only straight lines. Around the edge of the square write the measurements of the shapes. See if you can work it out. The answer will be included in the next edition of 'on the mark'.

