

New dairy and cereal CRC bids proposed



Cereal and dairy industries to benefit if CRC bids successful

The cereal and dairy industries could soon benefit from having their own CRCs, after the MPBCRC Board announced that two new CRC bids will be put forward for the upcoming funding round.

By raising the two applications, it is hoped to more effectively focus on some of the big issues in crop improvement, with one application concentrating on sustainability within the cereals industry, and the other focusing on the dairy industry.

Under the Commonwealth CRC Program, CRCs are funded for a seven year period. At the end of this time, if the CRC can identify new research and industry imperatives, they have the opportunity to apply for another round of funding.

MPBCRC Chief Operating Officer Ian Christensen said the process is extremely competitive.

"The Commonwealth really puts existing CRCs under the microscope," he said. "There could be as many as 30 different CRC applications this round. It is incumbent upon us to demonstrate a strong industry-driven need for new research in each area."

"MPBCRC has had considerable success in assisting industry to adopt DNA marker technology into their commercial breeding programs, but there are many new challenges to address."

"The threat of climate change is a challenge for all of us, and is especially serious for agribusiness. Farmers in particular will be affected as temperatures and rainfall patterns across the country change. Ensuring high yields under changing agricultural conditions is a challenge to breeders, but we are confident that newly emerging technologies will enable this to occur. Similarly, it will be important to ensure that manufacturers have consistent access to high-quality grains in the coming decades."

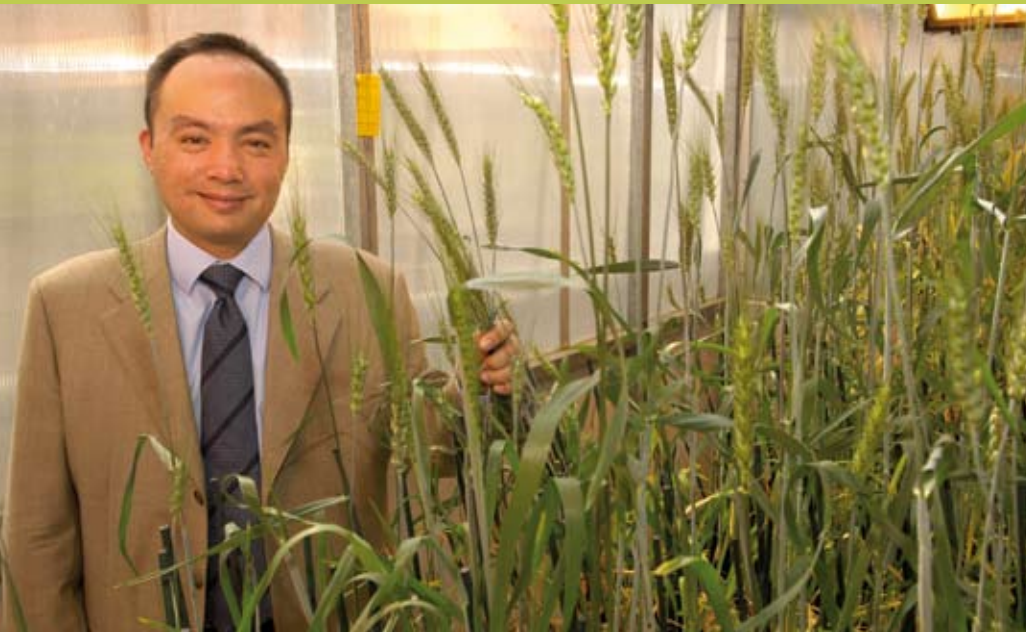
"This is a real opportunity for farmers, bulk-handlers, millers and brewers to leverage government funds for research they otherwise would not or could not do alone. I'm keen to talk to any and all businesses interested in joining this venture."

Preliminary applications will be submitted to the Commonwealth once the new guidelines are released in early 2008, and successful candidate CRCs will then be invited to present a full business case later in the year.

Any organisation interested in participating in either of the new CRCs should contact Ian Christensen (Ian.Christensen@molecularplantbreeding.com) for cereals or German Spangenberg (German.Spangenberg@DPI.vic.gov.au) for the dairy bid.



From the CEO



It's an exciting time for MPBCRC. With this, our fifth year, we've had to make some important decisions about our future; whether we enter a bid for a new CRC, and what form that might take. After many discussions with the Board, researchers and other stakeholders, the decision has been made to enter two separate CRC bids. A cereals bid and a dairy bid are now under development, and the respective bid teams are working hard to bring all the information together. I am confident that there is a genuine need for ongoing research in both fields, and I will be doing my utmost to ensure a successful outcome in both cases.

I would like to offer my profound thanks to Dr Amanda Able for her inspired leadership of the MPBCRC Education Program over the last four years. MPBCRC's Education Program occupies a favoured position among CRCs, due in no small part to Amanda's commitment to education outcomes in the school, tertiary and community sectors. Amanda steps down as Program Leader so she can increase her focus on her research activities, and we wish her all the best for her future endeavours.

Our Annual Research Conference at the Barossa Valley in July was, as always, a highlight of our annual calendar. I'm happy to announce that next year's conference has now been booked, and will take place on July 23-25 2008 at the Novotel Forest Resort in Creswick, Victoria. This spectacular resort is currently under construction, so we will have a brand

new venue for our 2008 conference. Do set this date aside in your calendar; I hope you will be able to join us.

The Victorian and New South Wales governments recently announced that their moratoria on GM canola would be lifted in the first quarter of 2008. This is certainly cause for celebration, given that we and our commercial partners have invested substantial resources into the use of genetic technologies to develop improved crops. MPBCRC, along with much of the biotech community, worked very hard to ensure that the State governments were made aware of the facts around GM technologies. We made written submissions to the reviews in NSW, Vic and SA, and together with one of our commercial partners, PGG Wrightson, we attended an interview with the Victorian GM Canola Review Committee. In the weeks following the announcement of the lifting of the moratoria, I have been called upon to defend the decision on a number of occasions, including an opinion editorial in the Australian Financial Review and an interview on ABC Stateline. The message I have tried to convey is that now the moratoria have been lifted, let's get on with the job, and use these powerful technologies to help farmers.

As we race headlong into the Christmas break, I wish you all a relaxing and safe holiday season and a happy new year.

Glenn Tong

German gets the gong



ATSE President Robin Batterham presents German Spangenberg with his award

Professor German Spangenberg, Chief Scientist of the Molecular Plant Breeding CRC, has been elected a Fellow of the Australian Academy of Technological Sciences and Engineering (ATSE).

German received the award for his 'inspiring and innovative research in agricultural biotechnology and as a world leader in pasture plant genomics and gene technology'. German's work focuses on the use of gene technology to produce wheat and forages with properties such as increased drought tolerance and disease resistance.

ATSE is an independent non-government organisation dedicated to the promotion of scientific and engineering knowledge for practical purposes in Australia. The award was announced at the ATSE Annual General Meeting in Perth.

German has also had a recent promotion to the role of Executive Director of the Biosciences Research Division of the Victorian Department of Primary Industries.

German says it was a great honour to receive the award.

"I am very pleased to receive this award," he says. "But, in many ways it is testimony to the excellence of the work done by my many colleagues who work with me in plant genomics and plant biotechnology."

Finding genetic markers is now a SNP



Faster marker detection at reduced cost is Tania Tabone's main objective

MPBCRC researchers Tania Tabone and Matthew Hayden have discovered a new way to identify genetic markers that will help in breeding improved varieties of crops such as wheat.

DNA markers are a vital tool for the understanding of crop genetics and for molecular plant breeding. They allow researchers to pinpoint and select for genes that affect characteristics such as yield, drought resistance or cold tolerance.

The markers of choice for many plant species are known as SNPs (single nucleotide polymorphisms). A SNP is a single change of DNA sequence within a gene. Highly accurate, these markers lend themselves to fast identification of plant variants. Another advantage to SNPs is the ability for many different genes to be tested at the same time.

SNP markers are perfect for use in many crop plants, but their detection causes problems for researchers studying polyploid plants – those with more than two sets of chromosomes – such as wheat. Specific markers for genes within each set of chromosomes are technically difficult to discover and involve laborious techniques, taking up many hours of valuable lab time.

But now, Tania and Matthew have come up with a way to avoid these problems and speed up the process of gene identification.

“Our new technique, called ddSNP (dideoxy-terminated SNP detection), allows the fast identification of genome-specific SNP markers,” says Tania. The new method will be especially useful to find markers for genes that are important in crop breeding.

For Tania, the most exciting part of the team's discovery is being the first in the world to develop the new marker detection method.

“There's nothing else out there that can do what our technology does,” she says.

The two main advantages to Tania and Matthew's technique are speeding up marker detection, and reducing the cost. “Our method will make it easier for people to analyse candidate genes for the traits that they are interested in,” says Tania.

One of the main applications of the technology will be in the analysis of 'TILLING' mutants – plant populations used by researchers to determine gene function. There's also a great deal of commercial potential in the team's discovery.

“We've patented our method, and we're now in the process of developing software that will make the technology more automated,” she explains. “This will speed up the process even further.”

Tania and Matthew have also developed two new methods to assist in the typing of SNPs to select plants carrying desirable genes. The first method allows DNA typing to be scaled up at a low cost, allowing hundreds of markers to be tested in a single reaction, and the second allows testing of a single marker at a time. These techniques will allow a new level of flexibility in marker-assisted breeding.

Tania Tabone and Matthew Hayden are Molecular Plant Breeding CRC researchers based at the University of Adelaide. To find out more about the applications of their research, contact Tania on 08 8303 7158 (tania.tabone@adelaide.edu.au).

For commercialisation enquiries, contact Ian Christensen on 03 9479 1698 (ian.christensen@molecularplantbreeding.com).

Barley gene find could mean more beer per bushel



Beer lovers and barley growers could soon be raising their glasses to Australian scientists who may have found a way to increase beer supply.

PhD student Yumi Bonnardeaux has been looking for genes that protect barley from pre-harvest sprouting, a grain condition that causes substantial reductions in barley yield and significant economic losses for farmers.

Under prolonged wet or damp conditions, barley grains begin to germinate, or 'sprout'. Sometimes this happens while the crop is still standing, before the barley is harvested.

Pre-harvest sprouted barley is useless for beer making, because the starch has been degraded and the grain can't be malted. Instead, farmers are forced to sell their grain in the considerably less profitable animal feed market, and beer drinkers are denied the ales and lagers for which Australian barley is known.

Yumi says that pre-harvest sprouting could be eradicated by breeding barley lines that contain 'dormancy' genes.

Similar to the way bears hibernate in winter and emerge in spring when the weather is warmer and food plentiful, the seeds of many plants have a mechanism which enables them to delay germination until the conditions are favourable for growth.

"Warm temperatures or rain can act as cues for seeds, telling them that the time is right for germination," says Yumi. "But, dormant seeds are prevented from germinating, even under the conditions that encourage germination."

"The greater number of dormancy genes a barley plant has, the greater its resistance to pre-harvest sprouting.

"The challenge is to develop barley grain that is dormant enough to withstand pre-harvest sprouting, but not so deeply dormant that the grain doesn't germinate during the malting," explains Yumi.

Ironically, pre-harvest sprouting is a result of our own quest for the perfect beer.

"Over the years, farmers have continually selected and bred varieties with lower seed dormancy to provide grain that will germinate rapidly in the malthouse. As a result, malting varieties often have low dormancy and are more susceptible to preharvest sprouting."

Yumi has found pre-harvest sprouting to be a complicated trait, controlled by multiple genes and environmental factors.

"Depending on the environment, different dormancy-controlling genes get switched on. That's why different samples of grain from the same barley variety may have different dormancy responses depending on the site they are grown on.

"This is also why it's difficult for breeders to reliably predict which barley lines will have pre-harvest sprouting tolerance, as this can change from year to year."

As a part of her PhD research, Yumi has located regions of barley chromosomes that may contain previously unidentified dormancy genes. These have been tested extensively for pre-harvest sprouting over two seasons across different sites.

Using *Arabidopsis* as a guide, she has identified several potential dormancy genes and is now mapping these in the same barley population.

"The next step is to find out whether these genes are located in chromosomal regions known to be involved in controlling dormancy in barley. This would identify whether they are candidate genes for further research."

Once it is certain which genes confer the dormancy ability, molecular tests can be developed that predict which varieties have these genes. Plant breeders will then be able to develop varieties that are tolerant to pre-harvest sprouting.

For more information, contact Yumi Bonnardeaux at yumiko@cbbc.murdoch.edu.au

Fresh fields for Education Program Leader



MPB Education Leader Amanda Able to increase focus on research

After more than four years as leader of one of the most successful CRC Education and Training Programs, Education Program Leader Amanda Able has decided to move on to fresh fields, starting with a sabbatical at the University of Queensland's Gatton Campus.

"I'll still be involved in MPB, mainly through my research, but I started my career in post harvest physiology, and I'm keen to expand my research portfolio in this area," says Amanda.

"At Gatton, I'm going to be working in the Centre for Native Floriculture and expanding my knowledge of the native products supply chain, as well as developing more links within the post-harvest network."

Amanda grew up in Toowoomba and has a PhD from the University of Southern Queensland. She worked with the Queensland Department of Primary Industries as a post-harvest plant physiologist, researching senescence in leafy Asian vegetables, before coming to the University of Adelaide in 2001.

Since then, Amanda has established a research niche in the field of plant-pathogen interactions.

"I've been interested in how plants defend themselves since I was young," she says. "I guess that's why I'm interested in getting young people interested in plant science too."

In addition to her research, Amanda is passionate about teaching, learning, and raising the awareness of science in the community.

As a senior lecturer, she coordinates and teaches undergraduate courses in plant molecular biology, coordinates Masters in Plant Biotechnology, and supervises a number of postgraduate students. She was awarded the Executive Dean's Excellence in Teaching Award in 2005, and was named South Australia's Tall Poppy of the Year in 2006.

Although receiving a CRC Association Award for Excellence in Innovation in Education and Training and Public Outreach in 2006 has been an obvious highlight, Amanda's personal highlight as Program Leader has been the student retreats.

"I think this has been the best thing that we have done, and what I have found most rewarding personally," says Amanda. "We have such a fantastic bunch of students. It's great to work with them – they are our future."

In addition to her own MPB research, Amanda will continue to be involved in various education and communication projects. In particular, she will continue to manage the production of the Molecular Techniques DVD.

New Education Officer for Get into Genes



Education Officers Marie Thorpe and Belinda Griffiths

Belinda Griffiths is set to take over the reins as Education Officer from the end of January, running genetics workshops for high school students.

As a high school science teacher with a degree in arts/science and honours in genetics, Belinda has wanted to get into a non-formal teaching setting for a while. "I'm very excited about the new job," she says. "I've already been scouting for clients – I've told all my ex-students to hassle their teachers to bring them along!"

Belinda comes on board as Get into Genes enters a new phase, with La Trobe University joining the program as delivery partner and financial supporter.

Belinda says she's also looking forward to expanding the program and developing workshops for farmers.

Belinda replaces Marie Thorpe, who is heading off to Melbourne University's School of Botany to take on a schools liaison position. Marie says she will miss the Get into Genes gig, but is also looking forward to her new role.

"I'm not sure I'll ever find a job I'll enjoy as much as Get into Genes!" says Marie. "I loved the variety of tasks – every day was different. The relative independence that I had to run my own show was great too. But, the best thing about the job was the really nice people I've worked with – especially Heather Bray and Belinda Barr."

www.getintogenes.com.au

Postcard from Syria



Ancient Citadel at Aleppo, Syria



Maarten van Ginkel

Horsham and Aleppo are both hot, dry, committed wheat producers, but that's about where the similarities end. Maarten van Ginkel has made the move from rural Victoria to northern Syria, and shares some thoughts on his new home.

What's your new role and what will your new responsibilities be?

I am Deputy Director General - Research of the International Centre for Agricultural Research in the Dry Areas (ICARDA), which is the #2 position in the centre. We have a \$35 million annual budget, work in more than 25 countries, and employ about 1,000 staff.

We work on multiple projects simultaneously. This makes the job exciting, especially as the speed at which good ideas are promoted is high, keeping you on your toes. Our emphasis is on drought, heat, and lasting disease resistance, etc., all within a livelihood scenario. I am also involved in appointing new science staff, with several positions now being filled or soon to open.

What is ICARDA's main focus?

We focus on 'research for development'. ICARDA is located at the centre of origin of many major food crops, such as wheat, barley, lentils, faba beans, chickpeas and forages. Much of our work is on pre-breeding of crops and developing genetic resources. Other research includes livestock, biotechnology, water and land management to offset degradation, agronomy, conservation agriculture and many other areas.

All our research is done in collaboration with the national programs, and is mostly

community-based and participatory, with a special emphasis on gender-related issues.

Our major target region close to home (Western Asia and North Africa) has many similarities with major agricultural zones in Australia. The GRDC, for example, has realised this and has signed an agreement with ICARDA on research in three areas.

Will you continue to be involved in your synthetic/transgenic work?

I hope to be continuously involved, but at a conceptual and cooperation level. Our preference is to do that via the new MPBCRC. I hope this cooperation materialises soon. We are building a brand new containment facility at ICARDA, and are already involved in transformation of several crops such as wheat and pulses. The results of the non-host resistance work I was involved in identifying at DPI-Vic were among the most mind-blowing of my experiences in Australia: it was supposed to work in theory, but seeing it do so in reality was something else.

What sort of opportunities for collaboration are there?

We aim to greatly increase our collaboration and there are myriad opportunities, as the climate and soils are very similar. ICARDA should be the CGIAR centre of choice for Australian agriculture in its Mediterranean production zone.

We aim to expand our collaboration with the major research groups in Australia, particularly to enhance our capability and application of marker-assisted selection in breeding, water and land management approaches in the face

of severe and repeated drought and heat, and small ruminant research targeted at rangeland management in the face of land degradation.

What's Syria like as a place to live?

It is a very interesting place, with a long history of human involvement. I felt at home right away here from day one, and the vast majority of the foreigners living here just love the place. The food is superb, and the historical buildings speak of the many centuries of civilization, including a citadel from around the year 1,100.

The climate is Mediterranean, which means semi-arid. I enjoy walking around the city, especially seeing all the people out and not locked up at work or at home. The culture is based on many religions. I have been very interested in the Islam religion for a long time and the comparative aspects with the other two Abrahamic religions, which I can explore further here. There are always people on the street to interact with, which is very different from many Australian towns.

What are you most looking forward to in your new role?

The opportunity to significantly affect the lives of people in the poorer part of our world, through the implementation of scientific insight. That is a very satisfying way to spend one's days. I wake up every morning early and eager to go to work.

I very much hope and look forward to working with many of you again as the new MPBCRC is being formed, of which ICARDA aims to be a part. I invite you to drop by when you are in the neighbourhood.



On the mark is produced quarterly. All contributions are welcome. If you have news about MPBCRC activities, events, research or international travel please contact us for inclusion in the next newsletter.

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The final word...

"...Take rest; a field that has rested gives a bountiful crop." - Ovid

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