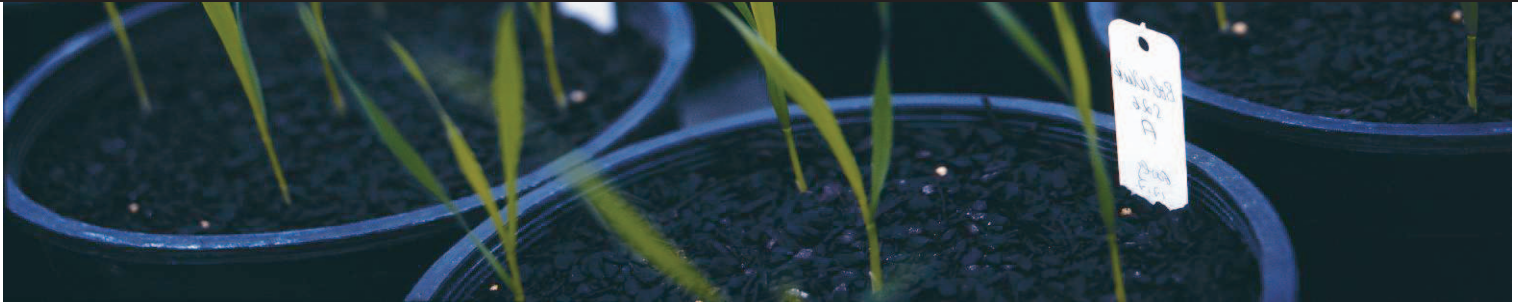


The Australian Centre for Plant Functional Genomics

Functional News! March - June 2005



Research News from the ACPFG The BAC Library

Dr Bu-Jun Shi, Research Fellow at the ACPFG, has made significant developments over the past month in generating a new 'BAC library'.

BACs' (Bacterial Artificial Chromosomes) are a relatively new tool used in genetic research, emerging in 1992. They are important in helping increase the efficiency of identifying gene position within the genome, sequencing and cloning genes of interest.

The advantage of using a BAC library over other systems is that they can contain stabilized DNA inserts up to 350 kilobases in size. This means we can scan large areas of a DNA fragment from a region we are interested in. For example, from one BAC, we can zero into around 10 genes out of 40,000 in the whole genome. Since the BAC DNAs can be easily isolated, it provides a means to single down to one gene and identify its function.

Construction of BAC libraries is a time consuming process and is technically demanding. Normally, it could take several years to complete a single BAC library. However, thanks to the hard working team at the ACPFG, lead by Dr Bu-Jun Shi, a new library has been developed in just over a year.

Dr Shi has developed a specific barley BAC library. It is a line which contains boron tolerance on chromosomes 4H and 6H and sodium exclusion on chromosome 1H. This new library is expected to have 10 times the genome coverage, making it one of few BAC libraries to have such a deep coverage for a large genome. More significantly, the new library in initial tests has an average insert size of 180kb, making it the largest average 'insert size' containing BAC library for barley reported so far.

Following the successful development and speed of developing the Barley BAC library the pathway has been paved for the development of new libraries. Specifically, the ACPFG are now working on constructing a rye BAC library, which is specific for aluminium and other tolerant traits.

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ACPFG - New Vector

Dr Andrew Jacobs and Jodie Kretschmer have produced a high throughput binary vector for Arabidopsis (a model plant) for transformation.

"This vector gives ACPFG scientists the capacity to clone any promoter and gene of interest in one recombination step" commented Dr Andrew Jacobs. "It provides researchers at the ACPFG with a valuable tool for analysis of genes involved in abiotic stress"

"Further, we are currently producing a barley / rice transformation vector with the same capacity. This tool will be available for our research team soon".

Adelaide Salinity Symposium

A mini salt symposium was organised by Mark Tester on the February 2005 to coincide with a visit from André Läuchli (University of California, Davis), a leader in the field of salt and boron toxicity in plants. The goal of the meeting was to bring together fellow scientists from Adelaide and further a-field to discuss their current work on improving the resistance of Australian crop plants to salt and boron toxicity, in an effort to address the growing yield loss arising from ongoing rises in toxic concentrations of these elements.

There were 16 talks in total including presentations from André Läuchli, Rana Munns (CSIRO, Canberra), Rob Reid

(University of Adelaide, Adelaide), Phil Davies (SARDI), Mary Beilby (University of New South Wales, Sydney) and Rob Stevens (SARDI). The ACPFG was also well represented with presentations from Mark Tester, Tim Sutton, John Patterson and Alex Johnson. The highly stimulating day was rounded off with an Italian dinner at the Buonasera Restaurant on Glen Osmond Road.

Education News from the ACPFG

Get into Genes

Already in 2005, over 400 students have visited the Plant Genomics Centre to conduct the ACPFG and MPBCRC's collaborative workshop, Get into Genes.

Get into Genes is an education program that directly links gene technology, with agricultural research and other real-world applications. The workshop begins with a presentation covering the fundamentals of DNA and its application in a plant breeding program. Students then rotate through four interactive workstations; DNA extraction, the use of molecular markers, gel electrophoresis and conventional breeding. The workshop is then drawn together with a talk addressing the use and applications of GM, providing real world examples.

Get into Genes has been developed with well structured learning outcomes that address the secondary school curriculum. Further, it is the only workshop in SA that takes place within a working research facility.

To cater for rural schools, Get into Genes is delivered as an outreach program to rural South Australian Schools. Since commencement of the workshop we have visited Cummins, Balaklava, Orroroo and Clare Area Schools.

Given the success of Get into Genes throughout South Australia, we are now working on extending this SA initiative to Victoria and Western Australia.

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