

Achievements and activities of the CRC in relation to research, commercialisation/ utilisation and education outcomes for the reporting period.

Completion of the strategic research areas identified during our third year review has been the focus of our research activities this past year. The review provided the best opportunity for our CRC to meet our overall research objectives as identified in the original CRC SIIB Commonwealth Agreement.

Research achievements

Our investment in genomics has contributed enormously to the creation of the world's most extensive genomic map of sugarcane (one of the most genetically complex crop species). During the course of our CRC, technologies to support this achievement have been identified and utilised in the construction of the map. At this stage of our CRC (i.e. wind up) the full sequencing of sugarcane DNA is only a short time away. Through our CRC, the Australian sugarcane industry is playing a key role in an international effort to map the sugarcane genome.

Concurrent with this has been a significant effort by our CRC to develop a molecular marker strategy for use in Australia's commercial sugarcane breeding

program. A series of complex markers have been identified and commercialised through the DArTs technology. This marker system was recently initiated in the commercial breeding program and will be the focus of ongoing research into more efficient and effective breeding strategies for the Australian sugarcane industry. In particular, the markers are being applied in the improvement of the parental population.

Our efforts to identify diversification opportunities for the sugarcane plant have continued with the emergence of a major bioactive discovery in sugarcane. In laboratory and more recently, small-scale human trials, the compounds successfully moderated the Glycaemic index value of foods. Originally identified some years ago by our CRC as a potential extract, the key ingredient components and their extraction from sugarcane are proving to be very successful. Now identified as GI Wise™, the extract is one of our key commercial outcomes to be adopted by the commercial company to flow on from our CRC, Sacron Innovations Pty Ltd.

Our continued investment in the expression of commercially viable levels of biodegradable plastic PHB (polyhydroxybuterate) has resulted in potential new opportunities for Australian sugarcane and for 'greener' plastics into the future. Identification of key steps in the chemical pathways within the plant organs has enabled innovative opportunities to



increase PHB expression levels beyond our original expectations. Complementing studies have led to the creation of a world-first metabolomics study in sugarcane.

The world's attention on using the sugarcane plant as the basis for plant-based expression of industrial products, as well as the development of input-based GM sugarcane (i.e. drought resistance, nitrogen efficiency etc), has required a far better understanding of the basic biology of sugarcane. Our CRC has funded research into understanding gene flow between sugarcane varieties and between sugarcane and closely related species of grasses. Studies in this area have been the basis of international collaborations and visits over the last 12 months. In full cooperation with Australian regulatory groups, research results now provide the world with a much better understanding of the flowering and potential weediness of sugarcane. The



information will be used in national and international arenas to assist in the deregulation of GM sugarcane events.

Our CRC's commercialisation program has continued to identify strategic commercial partners to carry our research outcomes forward to commercialisation. These alliances now having us testing Barrecote™ in Australia, USA and Europe. Barrecote™ is a fibre extract which provides the basis for a waterproofing treatment for paper. As a replacement to wax, the technology provides a recycling capability for treated

paper not available when waxes are used as the waterproofing agent. Barrecote™ will be one of the first major products to be managed by Sacron Innovations Pty Ltd.

Education outcomes

Two aspects of the CRC's Education Program have continued to attract significant interest.

The training efforts of our 30 postgraduate students have progressed well. Our students have made a major contribution to the scientific publications

of the CRC over the last seven years and, in particular, have been significant authors to five of the seven patents filed by the CRC.

Our investment in educational research into the development and understanding of teaching techniques and the effectiveness of biotechnology teaching modules attracted a great deal of attention both here and overseas. The PhD staff involved have been sought after in terms of delivering the key findings of their work to many international education forums.

Executive Summary (cont'd)

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Risks, opportunities and responses to the above.

The CRC R&D portfolio has given rise to (currently) six patents which are now being commercialised by the CRC IP Company Sacron Innovations Pty Ltd. This commercialisation process involves significant levels of further investment and a continuing risk of commercial failure. However, based on the reaction from the global market place the opportunities created by the technologies are even more significant and promising.

For the remainder of the CRC, IP will become platform technologies and background IP to many on-going projects undertaken by the CRC Participants.

Impediments to achievement of the CRC's objectives experienced during the year and strategies adopted to address these.

As reported in 2008/09, the challenge to double the value of the Australian sugarcane

industry remains unlikely. Our CRC has created a number of technologies with significant global markets that are now under consideration. In terms of the long-term profitability of these new technologies, the value proposition for Australia remains in global adoption.

2009/10 Highlights

- > Development of the world's most extensive sugarcane gene map.
- > Application of the first ever molecular marker system (based on DArTs) to the Australian sugarcane breeding program.
- > Research that shows new sugarcane-based bioactive proves highly effective at reducing GI.
- > Expression of PHB levels (biodegradable plastics) reaches higher-than-expected levels.
- > A world-first study into weediness of sugarcane study that will help with the future safe release of GM sugarcane
- > Commercialisation that achieves enormous national and international interest in recyclable paper coating, Barrecote™.
- > Specialised biotechnology education project with strong interest both here and overseas.