



Molecular Plant Breeding CRC



**>> Putting Plant Breeding
into Fast Forward >>**



>>Putting Plant Breeding

MPB Research: focussing on outputs

One day, Australia's crop and pasture industries will be underpinned by innovation in molecular plant breeding. That's our vision.

We're working to develop molecular marker and genetic engineering technologies, and deliver them through cereal and pasture breeding programs. That's our business.



What are molecular markers?

Genes are the basic units of information that form the 'blueprint' for all life. But locating the exact gene you're after can be difficult. How do you find one gene in 30,000?

Molecular markers are the genetic signposts that flag the presence of genes that control particular traits. For example, by identifying a gene that controls a plant's ability to tolerate salt, we can develop new lines of wheat that can grow in areas affected by salinity.

Molecular markers can be used to identify the presence of a gene directly from a sample of plant or grain without resorting to the more lengthy process of screening for physical or chemical characteristics.

What is genetic engineering in plants?

Genetic engineering is the process of removing, modifying or adding genes to a strand of DNA to change the information it contains. Altering this information results in specific changes in the type or amounts of protein a plant can produce.

For example, ryegrass produces a protein in its pollen that causes an allergic reaction in humans. By 'switching off' the gene responsible for producing this allergen, we can develop grasses that do not produce an allergic reaction, thereby easing the burden of hay fever on the community.

into *Fast Forward* >>

MPB Products

Australian agriculture is constantly changing. Science and technology are central to every aspect of modern farming practices. If Australian farmers are to continue leading the world in terms of quality, yield and sustainability we need to stay focussed.

That's why MPB has over 100 researchers focussed on delivering intellectual property and scientific know-how with real world applications. Our research will one day contribute to the following outcomes.

Pastures

- Grasses and clovers with improved herbage quality and nutritive value to ensure healthier livestock
- Low-allergen grasses to reduce the burden of hay fever, a condition suffered by millions of Australians
- Grasses with natural defences to insects, to ensure richer, greener pastures
- Clovers which prevent livestock from developing bloat, a condition that can result in illness or death

Wheat

- Wheats with tolerance to environmental stresses such as low moisture and waterlogging
- Disease resistant wheats to prevent the millions of dollars lost to fungal and nematode infection annually
- Wheats with tolerance to salinity
- Premium quality wheats to suit Asian export markets
- Wheats that are not susceptible to preharvest sprouting: the germination of the grain prior to harvest, which can substantially reduce grain quality

Barley

- Barleys with tolerance to low moisture environments
- High malting quality barleys
- Barleys with tolerance to salinity
- Disease resistant barleys
- Barleys resistant to preharvest sprouting

Technology

- Molecular markers and marker-trait maps
- Cheap and rapid techniques for routine implementation of molecular technologies in breeding programs
- Bioinformatics – software to help analyse and understand DNA sequence information
- Software for predicting the offspring characteristics that will be produced from crossing different varieties of wheat





Commercialisation

Delivering tools, breeding lines and cultivars to industry

Our commercialisation program has been created to protect and manage the Centre's intellectual property, and to develop and implement mechanisms to facilitate industry adoption of new technologies. We're working to commercialise MPB products, technologies and services by:

- introducing our genetic engineering technology into industry relevant elite breeding lines
- delivering MPB breeding lines to industry
- providing industry with the genes, tools and knowledge to increase the speed and efficiency of plant breeding
- establishing a genetic transformation and genotyping service facility to support our clients' molecular breeding programs.

All MPB intellectual property is owned by the company 'Molecular Plant Breeding Nominees Ltd', which holds it in trust for MPB's core participants.

An operating company, 'Molecular Plant Breeding Pty Ltd', acts as agent for MPB to facilitate commercialisation of Centre intellectual property via licence agreements.

MPB enters into research and business arrangements where they can provide mutual benefits that help ensure the delivery and adoption of MPB products and technologies. These arrangements may involve, for example, collaborative research efforts, licence agreements and contract research services.

Education and Training

MPB delivers education programs and opportunities across the learning spectrum, from school and community groups through to tertiary students and industry professionals. The public relations and education activities of our participants are vital to the continued success of this program.

Summer and Honours scholarships

MPB offers opportunities for undergraduate students to experience real world research using cutting edge technologies. Tax free scholarships are provided, and Honours students have the opportunity to participate in professional development training. By participating in MPB research, undergraduates gain a head start on their peers, enabling them to put their careers into fast forward.

PhD scholarships

Demand for skilled professionals in the fields of plant biotechnology and breeding is high. That's why MPB offers its PhD students a scholarship package second to none. All MPB PhD students receive:

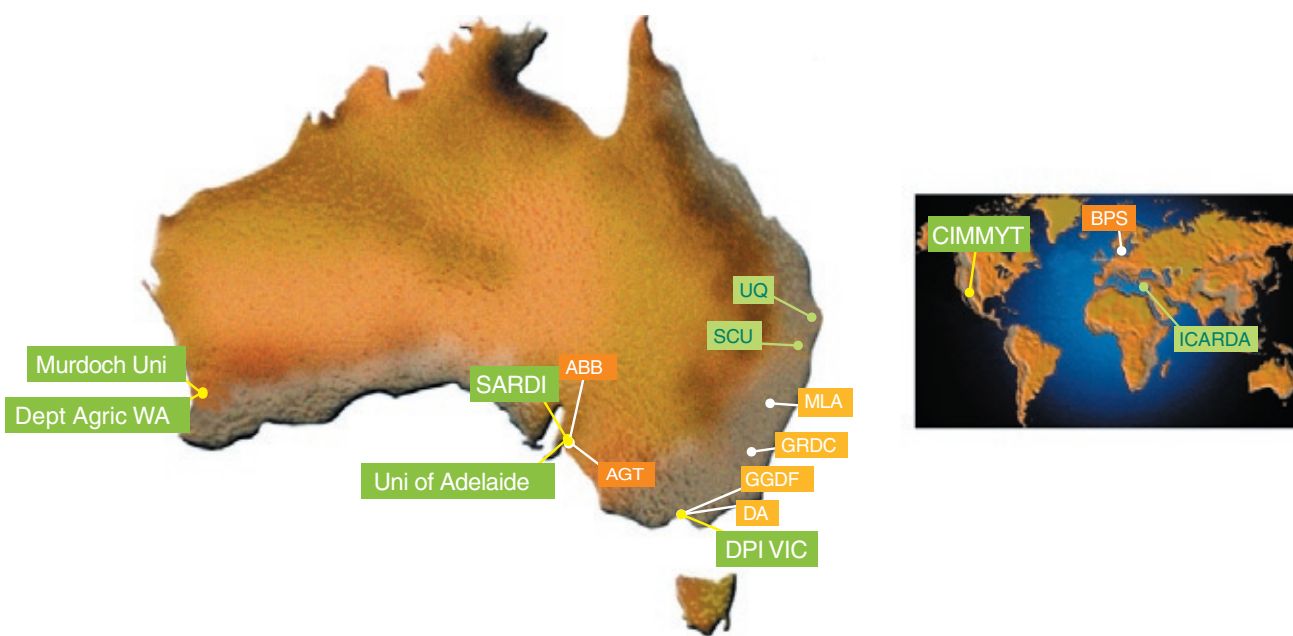
- a project with industry relevance
- tax free remuneration in excess of the Australian Postgraduate Award scholarship
- training in media, presentation and other professional skills
- training in intellectual property and commercialisation
- overseas conference travel
- opportunities to take part in a number of specialist courses offered by MPB Training.

Our PhD students tell us they get more than their non-MPB friends. We're looking to attract the chief researchers, biotech CEOs and professors of tomorrow. That's why we offer more.

MPB Training

MPB is a world leader in molecular marker research. So it's only logical that we're leading the way in providing training to scientists, industry and others who may benefit from the skills and knowledge we have acquired.

See www.molecularplantbreeding.com for more information.



Core Participants
 Supporting Participants
 Commercial Partners
 R&D Corporations

Partners

Core Participants

- Department of Primary Industries, Victoria
- The University of Adelaide
- South Australian Research and Development Institute (SARDI)
- Department of Agriculture, Western Australia
- Murdoch University
- International Maize and Wheat Improvement Centre (CIMMYT), Mexico

Supporting Participants (Research)

- Southern Cross University (SCU)
- University of Queensland (UQ)
- International Centre for Agricultural Research in the Dry Areas (ICARDA), Syria

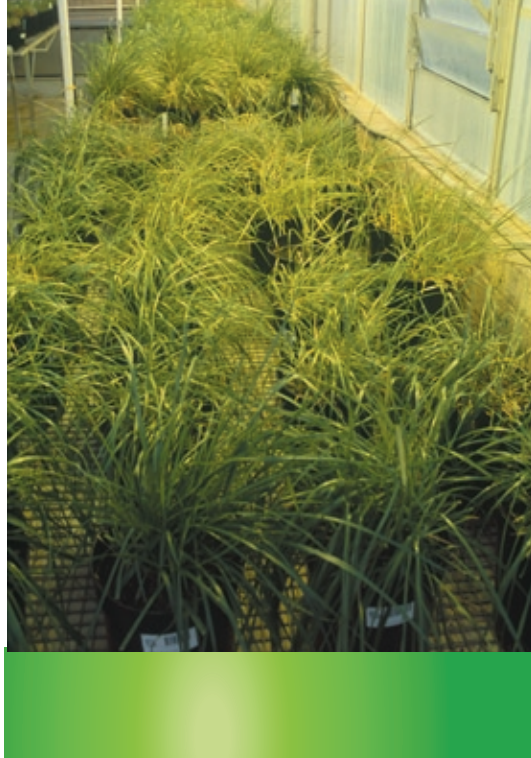
Commercial Partners

- Australian Grain Technologies (AGT)
- BASF Plant Science (BPS)
- ABB Grain

Technologies for barley breeding will be implemented through the core participant breeding programs in WA, Vic and SA.

R&D Corporations

- Grains Research and Development Corporation (GRDC)
- Dairy Australia (DA)
- Meat and Livestock Australia (MLA)
- Geoffrey Gardiner Dairy Foundation (GGDF)



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The new Molecular Plant Breeding Cooperative Research Centre commenced on 1 July 2003, with funding for seven years from the Federal Government. It builds on the success of the first CRC for Molecular Plant Breeding that operated from July 1997 to June 2003.



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