



# What is the MPBCRC?

The Molecular Plant Breeding CRC (MPB) was formed in July 2003 under the Cooperative Research Centre Program funded by the Commonwealth Government. The CRC Program aims to foster collaboration between government, higher education and private industry. MPB is a joint venture made up of the following core participants:

## 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

Other supporting participants join with us for specific projects.

## Supporting Participants – Research

- Southern Cross University
- International Centre for Agricultural Research for Dryland Areas (ICARDA), Syria

## Supporting Participants – R&D Corporations

- Grains Research and Development Corporation
- Meat and Livestock Australia
- Geoffrey Gardiner Dairy Foundation
- Dairy Australia

## Supporting Participants – Commercial

- Wrightson Ltd
- Australian Grain Technologies
- ABB Grain Ltd
- BASF Plant Science

MPB has offices in Melbourne at Bundoora (Head Office) and at the University of Adelaide (Waite Campus) which accommodate the administration and support staff.

The research staff are located at centres within the core and supporting participant organisations in Melbourne, Adelaide, Hamilton, Horsham, Perth, Lismore, Brisbane, Mexico, Syria and Germany.

## What we do

MPB aims to develop new technologies in plant molecular biology and implement effective strategies for their use in cereal and pasture grass improvement programs.

The focus of the Centre is on molecular marker technology and genetic engineering relevant to cereals such as wheat and barley, and pastures such as perennial ryegrass and clover.

The technologies developed by MPB will be commercialised and delivered through the involvement of breeding organisations and seed companies. The strategies we develop provide the research base, tools and training for the next generation of plant breeders.

MPB has 3 key research programs and an education program.

## Transgenics: developing gene systems and delivering transgenic technologies

Key research areas include:

- meiosis and recombination – important stages in plant reproduction
- interactions between plants, the environment and diseases for identification and of new genes and gene systems
- new and improved systems for genetic modification
- genes and gene systems for plant breeding programs
- strategies for GM-based breeding
- GMO impact and risk assessments.

The ultimate outcomes will be:

- new transgenic crops with:
  - improved disease resistances
  - new quality attributes
  - improved tolerance to environmental stresses such as drought, cold and salt
  - reduced chemical and fuel use
  - reduced allergies.
- economic benefits for the cereal and pasture industries including:
  - greater stability of production
  - reduced costs
  - improved competitiveness in the market place.

## New molecular technologies

Key research areas include:

- tools to graphically visualise a plant's genetic makeup to design ideal varieties with the optimum combinations of genes
- software for predicting the outcome of plant cross-breeding
- bioinformatics – software to help analyse and understand DNA sequence information
- molecular markers – the genetic 'flags' that indicate the presence of genes of interest
- cheap and rapid techniques for routine use of molecular technologies in breeding programs
- whole genome-based breeding strategies – selecting for multiple traits at once.

The ultimate outcomes will be:

- major shifts in breeding methodology, tools and strategies
- significant increases in rate of genetic gain in cereal and pasture plant improvement
- new generation molecular breeding technologies delivered to breeding programs
- major improvements in new varieties using non-GMO techniques.

## Markers and genetic solutions

Key research areas include:

- molecular markers for key traits including disease resistance, improved quality and resistance to mineral toxicity
- improved strategies for molecular marker use
- improved plant breeding material using molecular marker technologies

The ultimate outcomes will be:

- improved plant genetics underpinning competitive Australian cereal and pasture industries
- faster development of new varieties
- varieties with traits not previously possible
- economic benefits for the cereal and pasture industries including:
  - greater stability of production
  - reduced costs
  - improved competitiveness in the market place.

## Education and training

The support and development of postgraduate students is undertaken as part of the Education and Training Program, although the research projects are administered through the research program structure. The Education and Training Program has 3 sub-programs:

- Community and Schools
- Tertiary (both undergraduate and postgraduate)
- MPB Training (professional and technical workshops and training).

Postgraduate students have the opportunity to participate in MPB Training events such as oral communication, media and intellectual property workshops. Technical training courses covering topics such as molecular markers in plant breeding are also available.



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For further information visit [www.molecularplantbreeding.com](http://www.molecularplantbreeding.com)

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