

## **ARC Centres of Excellence Program**

### **ARC Centre of Excellence for Integrative Legume Research**

**Interim Director: Professor P M Gresshoff**

**Collaborating Institutions:** The University of Queensland  
The Australian National University  
The University of Melbourne  
The University of Newcastle

Legumes, such as peas, chickpeas, lupins and soybeans, are very special plants. Their nitrogen fixing qualities assist sustainable pasture production and cereal crop rotation capability. Legume crops yield high quality vegetable oils, vegetable protein, and nutraceuticals such as anti-oxidants, phytoestrogens and folate.

Australia has a long record of outstanding legume research and its application to sustainable food production. The Centre will bring together an internationally competitive research team from the Universities of Queensland, Melbourne and Newcastle and the Australian National University to build on this research base through understanding the primary action of individual genes and the complex interaction of genes controlling plant development. The Centre has the opportunity to make a major breakthrough by the discovery of long-distance signalling molecules, including peptides.

The new knowledge will lead to new legume breeding and screening strategies, capable of side-stepping genetically engineered food products through smart breeding technology in which specific gene combinations, demonstrated to be beneficial, are selected from natural or mutated plant material through advanced molecular diagnostics.

Through fundamental research on processes affecting legume flowering, shoot branching, lateral rooting, stem elongation and nodulation, the Centre will improve understanding of ways to modify legume growth and architecture. For example, breeding pasture legumes with more extensive and deeper roots can help mine soil moisture and nutrients in areas where the water table is rising. This can provide competitive advantage in legume cropping, and also reverse environmental degradation through the use of legume rescue crops.

The Centre will implement a science and education program attractive to the community, farmers and scientists. There will be an emphasis on assisting secondary school teachers in the theme 'plants for health and the environment'.