

OVERVIEW

Research within the Plant Science Group is centred around two key themes:

- **Nutrient allocation** impacting upon crop yield and quality using molecular and cellular approaches.
- **Reconstructing sustainable ecosystems** with native vegetation.

Nutrient Allocation

Both fundamental and applied research is directed at:

1. *Nutriomics*. Nutrient (especially sugars) transport and metabolism within organs of agronomic significance (e.g. fruit and seed).
2. *Transfer cell development*. Specialised cells that play a vital role in nutrient allocation.
3. *Cotton fibre development*. A single-cell system, ideal for studying cell growth and cellulose synthesis.
4. *Biofuels*. Maximising carbon capture by key crops to produce superior biofuel sources.

Reconstructing Sustainable Ecosystems

1. *Rebuilding soils*. Use of plant-microbe associations to re-establish nutrient cycling.
2. *Restoration Potential*. Addressing ecological bottlenecks by modifying, monitoring and modelling native vegetation communities.

OBJECTIVES

The Plant Science Group is committed to research excellence through:

- Training Research Associates, Research Higher Degree and Honours students.
- Fostering established national and international collaborative linkages.
- Building research alliances with key industry partners in agri-business and coal mining.
- Contributing solutions to challenging global issues such as food security, renewable fuels and ecosystem restoration.
- Continuing development of cross-discipline activity through the Centre for Sustainable Ecosystem Restoration (CSER).
- Providing state-of-the-art research infrastructure and facilities for whole plant, cell and molecular studies.

RESEARCH TOPICS

Selected current topics of PhD candidates:

- Cloning and functional characterisation of novel membrane transporters.
- Inductive signals regulating transfer cell development.
- Sustainable nitrogen acquisition after coal mining using the Legume-Rhizobia symbiosis.

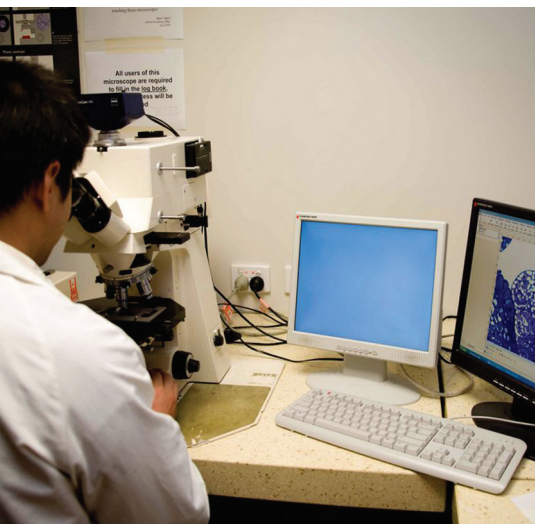
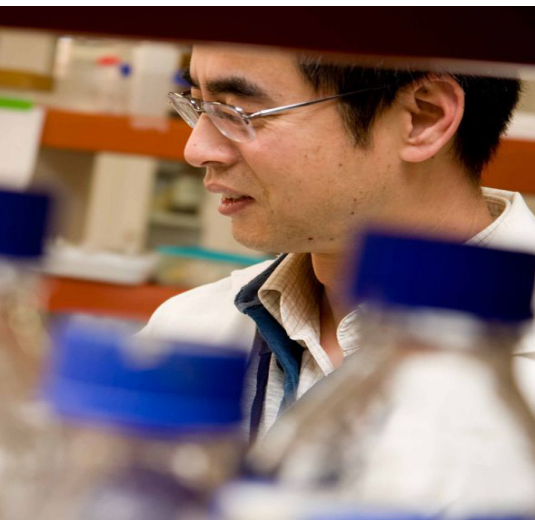
RESEARCH SUPPORT

Australian Research Council (ARC)

Discovery Project Grants
Linkage Project Grants
Linkage Infrastructure Equipment
Facility Grants

Industry Support

Pacific Seeds Pty Ltd
Syngenta Pty Ltd
Xstrata Coal
Thiess Pty Ltd
Australian Coal Association Research
Program (ACARP)



EXAMPLES OF CURRENT PROJECTS

Discovering the genes and processes responsible for signalling induction and regulating development of transfer cells.

Elevating sugar and biomass accumulation of Sorghum in arid environments through applying biotechnological innovations to produce a superior biofuel source suitable for both first and second generation bioethanol production.

Reconstruction of forest and woodland on mine spoil and disused pasture, and the cost effectiveness of different methods.

Understanding molecular mechanisms regulating seed and fruit development through sugar signalling.

RESEARCH OUTCOMES

Over the last 5 years:

Advancing scientific knowledge through publishing 75 refereed journal or review articles, 7 book chapters, 16 industry reports, 7 proceedings, 3 patents.

Continuous support through ARC and industry sources (\$>7M).

Strong research training resulting in 6 Research Higher Degree (PhD) completions.

EXTERNAL COLLABORATORS

The Plant Science Group is actively engaged in productive national and international collaborations with:

Prof AJE van Bel

Justus-Liebig University, Germany

Prof J Botella

University of Queensland, Brisbane

Profs XY Chen, JR Huang & WH Zhang

Chinese Academy of Sciences, China

Prof WB Frommer

Carnegie Instit., Stanford University, USA

Dr RT Furbank

CSIRO Plant Industry, Canberra

Prof I Godwin

University of Queensland, Brisbane

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University of Queensland, Brisbane

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University of Sydney, Sydney

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Purdue University, USA

Prof Y Tao

Zhejiang Academy of Agri Sci, China

Prof SD Tyerman

University of Adelaide, Adelaide

Dr. J Ward

University of Minnesota, USA

Dr C Waters

Industry and Investment, NSW

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Zhejiang Academy of Agri Sci, China

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Institut für Pflanzengenetik und Kulturpflanzenforschung (IPK), Germany

Prof TZ Zhen

Nanjing Agri University, China

GROUP MEMBERS

Academic Staff:

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