Novel sources for quality:
Australian contributions to rice quality

Robert Henry
Options for innovation

- Increased production-efficiency
- Increased product value-quality
Healthy populations
Rice is a staple food, but production is not keeping pace with the rise in global population. So scientists are dreaming big and aiming high to change the future for this crucial grain.

LEIGH DAYTON

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Rice wild relatives


Diversity of Rice in Australia
Current wild rice collection program
Wild relatives of rice
Ancestors of cultivated rice
Species A
Species B
Taxon A and Taxon B in their natural habitat in Queensland (Mareeba Wetlands); Taxon A – open panicles, Taxon B – closed panicles.

Evolution of rice

4000 genes
6 Mbp
Large wild rice populations

Photo Marta Brozynska
Cereal Starches

Wheat relative
A and B type Granules
A: <10\(\mu\)M
B: 10-50\(\mu\)M

Rice like Granules
Rigid dodecahedrons
2-5\(\mu\)M
Compound granules

Sorghum granules
10-30\(\mu\)M
Spherical to
non-uniform polyhedral
Novel rice starch properties

Health Starch and Plant Genetics

Starch Properties

Starch Chemistry

Starch Genetics

Identification of genes controlling quality
SNP associated with amylose content
*O. glaberrima X O.sativa*

High value rice for discerning consumers

Soon it will cost **less** to sequence a genome than to flush a toilet


Ajai Raj, 3 Oct 2014
Gene editing

Photo: Porteus lab Stanford
Domestication of New Crops

Microlaena domestication

Mitigation versus adaption

Agricultural Nanotechnology

Bioclay
Plant genetics

- Current genetic targets
  - Rice
  - Wheat
  - Coffee
  - Macadamia
  - Peanut
  - Mango
  - Kakadu Plum
  - Eucalypts
  - Sugarcane
CRC for
Distinctive Australian Foods
Growing premium brands

www.distinctive-australian-foods.com.au
RESEARCH PROGRAMS

Established industries research

Emerging industries research

Future industries research
International Rice collaborations

- Better Cereal Centre, College of Agriculture, Yangzhou University, Yangzhou 225009, Jiangsu Province, P.R.China
- Black/red rice program MOST, Vietnam
- Faculty of Agriculture and Life Science, Hirosaki University, Hirosaki, Aomori 036-8561, Japan
- ICAR New Delhi
- University Pune
- IOMAP collaboration

Capturing biodiversity for food security

23-29 July 2017
Large wild rice populations

Photo Marta Brozynska