

The Queensland Alliance for Agriculture and Food Innovation

CENTRE FOR HORTICULTURAL SCIENCE



Queensland Alliance for Agriculture and Food Innovation

QAAFI is an agricultural and food sciences research institute of The University of Queensland – one of the world’s leading research providers in tropical and subtropical agriculture and food production.

At QAAFI, our mission is to harness high tech science for sustainable agriculture and food production. To achieve this, we use game-changing technologies like artificial intelligence (AI), nanotechnology, genomics, gene editing and big data to produce safer, more nutritious food, using less resources.

Not only is UQ number one for agricultural science in Australia and one of the most highly ranked institutions in the world in this field, it is located in tropical and subtropical environments and, therefore, well placed as a hub for digital agriculture and delivering step-change innovations for the growth and production of sustainable and nutritious food.

Through our alliance with the Queensland Government, QAAFI researchers utilise world-class research field station facilities throughout tropical and subtropical environments in Queensland.

QAAFI delivers high-impact science to significantly improve the productivity, competitiveness and sustainability of tropical and subtropical food, fibre and agribusiness industries.

High impact science for sustainable agriculture and food

QAAFI is comprised of four inter-related research centres, with a focus on the challenges facing tropical and sub-tropical food and agribusiness sectors in the tropical and subtropical systems.

- Centre for Animal Science
- Centre for Crop Science
- Centre for Horticultural Science
- Centre for Nutrition and Food Sciences

Centre for Animal Science

Leading tropical livestock research and development

The Centre for Animal Science delivers world-class research to Australia’s animal industries. We aim to increase on-farm productivity and sustainability in the northern Australian beef industry and across the livestock industries, including pigs and poultry.

We have major programs and capability in genetics and genomics; breeding and reproductive capability of northern Australian cattle breeds; welfare and ethics; pest and disease control through improved detection; monitoring and vaccine technologies; nutrition; metabolism and growth.

Centre for Crop Science

Integrated research for cereal and legume cropping systems

The Centre for Crop Science conducts world-leading research targeting enhanced profitability and sustainability of cereal and legume cropping systems in tropical and sub-tropical environments.

We pursue excellence in crop science at molecular, whole plant, and production system levels. Our integrated research capabilities include crop genetics, physiology, and modelling, along with soil science and weed biology. We work closely with industry and government, and seek synergies to meet challenges in crop science at a national and international level.

Centre for Horticultural Science

Driving innovation and industry adoption

The Centre for Horticultural Science delivers improvements to productivity, profitability and sustainability of horticulture industries.

Our world-class researchers drive innovation and industry adoption to increase the competitiveness of Australia’s horticultural industries globally. Our expertise includes; Horticulture crop breeding and agronomy, Plant protection and Emerging technologies.

Centre for Nutrition and Food Sciences

Consumer ‘fork to farm’ research focus

The Centre for Nutrition and Food Sciences supports enhanced health outcomes and economic benefits for Australia, by conducting integrated fundamental and applied research to improve the taste, quality, appearance, nutritional value and safety of food.

We aim to understand the fundamental characteristics of food that influence processing, food quality, consumer perception and nutritional value.

Our Rankings



UQ is ranked #4 worldwide and #1 in Australia for agriculture

According to the NTU Performance Ranking of Scientific Papers for World Universities 2023



UQ is ranked #16 worldwide and #1 in Australia for Agriculture and Forestry

According to the QS World University Rankings by Subject 2023



UQ is ranked #20 worldwide and #1 in Australia for environmental sciences

According to the QS World University Rankings by Subject 2023



UQ is ranked #23 worldwide and #1 in Australia for food science and technology

According to the Shanghai Ranking’s Global Ranking of Academic Subjects 2023

Our research capabilities in horticultural science



Horticulture crop breeding and agronomy

Our focus is improving the productivity and quality of horticultural crops through application of genetics and genomics in selection and breeding, integrated with orchard agronomy.

Our research includes:

- Conservation and genetic improvement of horticultural crops
- Sub-tropical and tropical fruit tree crop breeding and improvement
- Rootstock evaluation and selection to improve productivity
- Improving orchard production systems



Plant protection

We undertake research in detection and identification of diseases in tropical horticulture, and develop integrated disease management practices to reduce crop losses, improve productivity and ensure product quality.

Our research includes:

- Detection and identification of emerging and exotic pests and pathogens
- Diagnostic capability for tropical plant diseases
- Disease management in avocado, banana, citrus, macadamia.
- Phenotyping germplasm for disease resistance
- Fruit quality



Emerging technologies

We deliver innovative cross-disciplinary platform technologies to impact the productivity, environmental sustainability and economic growth of the horticulture sector.

Our research includes:

- Nanotechnology for crop protection - BioClay platform
- Novel plant propagation technologies
- Germplasm conservation
- Genomics, gene editing and modelling for crop improvement

Highlights of QAAFI's research into horticultural science

Eradicating bunchy top from Australia to Africa

Queensland scientists are tackling one of the world's worst threats to banana crops – bunchy top disease – with help from the Bill & Melinda Gates Foundation.

Led by QAAFI's Associate Professor John Thomas, the research aims to tackle bunchy top disease by strengthening the ability to control and eradicate the disease globally.

The project involves controlling bunchy top in Nigeria and Benin, and looking for sources of resistance in Southeast Asia – the ground zero of banana disease. The project will look to Southeast Asia, where many bananas and their diseases originate, to identify wild species of seeded bananas that may have natural resistance to bunchy top.

qaafi.uq.edu.au/banana



Novel plant propagation techniques

A world-first innovative tissue culture technique that is set to double Queensland's avocado production and smash the global shortage of avocado trees.

To boost production of horticulture crops such as avocado, QAAFI research team led by Prof Mitter are combining microscopic tissue culture cuttings with new plant propagation techniques to produce hundreds of rooted plants from a single cutting in 12- months.

We are looking forward to translating this platform to propagate tree species such as macadamia, mango, lychee and other high value horticultural crops.

qaafi.uq.edu.au/tissue-culture



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