



Department of  
Primary Industries

# NSW DPI Grain Quality Group

## Capability statement



# NSW DPI Grain Quality Group

## Introduction

The food industry is the largest in the world, and the Australian grains industry contributes ~ \$12.8 billion to the economy. The NSW DPI Grain Quality Group (GQG) is part of the Plant Systems Division of the NSW Department of Primary Industries. The GQG includes seven researchers, located in one of five laboratories across three sites. This structure allows researchers to be based in the production area and research hub of their respective commodity. Our primary interests include pulses, rice, wheat (all grades, including durum) and canola, although we do work with other grains for both human and animal consumption.

*“Quality powers profitability”*



**Stronger Primary Industries**

“

*NSW DPI has spent over a century working to nurture and grow primary industries in NSW, with the first experimental farms commencing between 1892–1914. Continued research, innovation and education positions DPI to meet the challenges faced by NSW’s primary producers side by side, through this century and the next.*

”

Scott Hansen  
DPI Director General



# NSW DPI Grain Quality Group

## Mission

Our team mission is to increase and stabilise profitability for growers, enhance NSW agriculture, augment food quality and strengthen regional resilience.

We do this by contributing to grain quality assessment, developing improved varieties with higher yield and adaptation to biotic and abiotic stresses. We provide independent grain quality evaluation, develop new methodologies to improve phenotyping and research to better understand genotype × environment × management interactions (G×E×M). We also conduct pre-breeding research, validate molecular markers and develop novel food products and processes.

Ensuring grain quality is included in productivity-focused grain research projects is critical to maximise profitability and minimise price penalties for growers.

The GQG is in a unique position to work directly with growers, as well as industry and other research collaborators. We can readily lead and respond to emerging consumer-driven market opportunities, both locally and internationally, because we understand product specifications, food industries and their domestic processing requirements. We also help develop new domestic and overseas market opportunities.

**Profit = (yield × price – costs) × risk**

***The GQG strength lies in our ability to contribute to all terms in the profit equation with our multidisciplinary grain quality research.***

# Our scientists

## The GQG scientists are supported by highly experienced and skilled technical staff

The GQG strength is our comprehensive understanding of grains, from farm to fork, and applied impact-driven research. Each scientist conducts R&D at multiple stages in the supply chain (from farm to fork) to add value and has close links with key industry stakeholders. Our symbiotic relationship with breeding programs facilitates access to a wide range of germplasm. We have expertise in developing methodology and implementing new technologies for high-throughput phenotyping systems. All our efforts lead to a stronger, more profitable grains sector.

Our researchers are more than just food scientists, with multidisciplinary experience ranging across agronomy, physiology, breeding, genetics, method development, analytical chemistry, biochemistry, physiochemistry, market requirements, texture, nutrition (human and feed), sensory testing, consumer perception and food innovation.

Our researchers co-supervise post-graduate students, publish research articles in journals, write book chapters, host visiting researchers and tertiary students, and present at key conferences, grower field days and research stakeholder meetings.

For more information about our research staff please refer to the following:

**Durum wheat** – [Mike Sissons](#)

**Feed grains** – [Richard Meyer](#)

**Oilseeds** – [Jamie Ayton](#)

**Pulses** – [Jenny Wood](#)

**Rice** – [Rachelle Ward](#)

**Common wheat** – [Denise Pleming](#)

Full staff profiles are available at <https://www.dpi.nsw.gov.au/about-us/research-development/staff>



# Our laboratories

## Each grain quality laboratory is ISO9001 certified

- Each laboratory is furnished with specialised grain quality assessing equipment to measure a broad range of physical, chemical, processing and end-product qualities. Researchers also have access to chemistry laboratories, glasshouses, field trial sites, temperature-controlled storage and a wide range of germplasm.
- The pulse and durum quality laboratories are located at Tamworth, while the wheat, oilseeds and feed grain quality laboratories are at Wagga Wagga and the rice laboratory is at Yanco.
- We offer a fee for service testing
- We collaborate in R&D with external research groups, universities and private entities in Australia and overseas, as well as within NSW DPI (e.g. breeding services, agronomy, physiology, pathology, pastures, soil and water)





# Current projects

- The **durum** wheat research team is focused on strategic research in durum and provides quality assessment for Durum Breeding Australia and AGT. Recent research includes four postgraduate students on (i) waste use from bran, (ii) effects of heat on wheat production and quality, (iii) agronomic-disease-quality interactions in prime hard wheat/durum to optimise quality, (iv) strategies to reduce the glycaemic index of pasta and (v) G×E studies to optimise durum quality selection in breeding.
- The **feed** quality group provides analytical laboratory services to Agriculture NSW, plus other research and commercial entities in Australia and, on occasions, internationally. The team has expertise in a range of analytical methodologies related to feed testing and work associated with animal nutrition.
- The **oilseeds** research team has expertise in crops such as canola, sunflower and safflower, as well as olives and olive oil. Recent research includes the effects of G×E×M on physical parameters in canola, as well as the effect of frying on oil quality.
- The **pulse** research team works with the Australian chickpea breeding program and has expertise across other pulses, including faba bean, mung bean and pigeon pea. Recent research includes the effects of genetics, plant physiology, climate and agronomic management on grain defects (G×E×M), and identifying the effects of these defects on food processing qualities.
- The **rice** research team works with the Australian rice breeding program at Yanco to develop improved rice varieties for NSW. Recent research includes developing grain quality screening tools that reflect consumer-driven markets, understanding the effects that growing conditions have on rice quality (G×E×M) and how rice quality changes during storage. We have expertise in physical, composition and eating qualities of rice.
- The **wheat** research team focuses on quality assessment of new wheat lines to ensure they meet market requirements for specific classification standards. Recent research includes refining formulations and baking methods to improve the quality of lupin-wheat bread, identifying the genetic basis of heat tolerance in wheat, and applying wheat bran to bread formulations.



# Key R&D interest areas

## Multidisciplinary expertise to solve research and industry knowledge gaps

- Extensive cross-commodity collaboration
- Expanded involvement in grain productivity (agronomy, physiology, biotic) projects to measure profitability outcomes and meet consumer preference trends
- Mining diverse germplasm for unique and superior grain quality traits
- Harvest, storage and accelerated ageing
- Food and ingredient functionality
- Expertise in plant protein extraction and functionality
- Nutrient fortification and "food as medicine" research
- Collaborative links to grain nutrition (human and feed), sensory evaluation and consumer preference
- Maximise profitable grain use (i.e. minimising waste and value adding)
- Reducing grain defects and poor quality caused by abiotic and biotic stresses
- Developing new phenotyping tools using advanced technologies
- Strengthen molecular-assisted breeding through developing new genetic tools and marker-phenotype validation
- Extrusion modification to create novel grain-based products
- Crop physiology of grain filling and maturation

The GQG brings together these professional teams with the expertise to increase the productivity and profitability of plant systems, encouraging and promoting flexible, innovative multidisciplinary research. We welcome collaborations that build a stronger, profitable NSW agriculture.

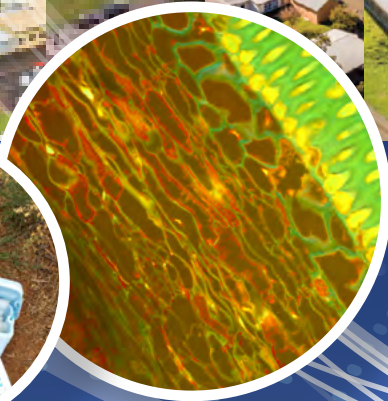
The GQG has independence, is trustworthy and free from conflicts of interest. Additionally, we provide a public service and conduct important grains research along the value chain where industry gaps are identified.

## Contact

For more information, [grain.quality@dpi.nsw.gov.au](mailto:grain.quality@dpi.nsw.gov.au)



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