# Innovation Projects

2023/24

# A short note from the Innovation team

**The Innovation team at Australian Eggs is dedicated to providing value to the egg industry, through investment in research, development, and extension programs**.
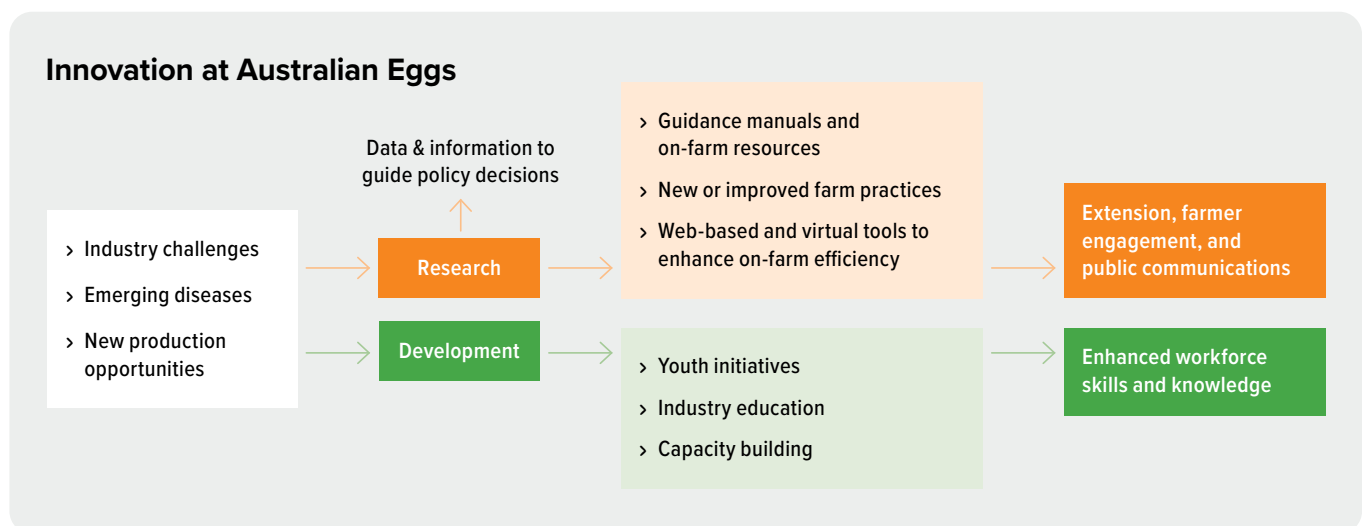
Improvement in productivity and long-term sustainability of the egg industry is obtained by addressing production priorites through delivery of quality research. Innovation projects are informed by feedback received from egg farmers and industry stakeholders and developed with guidance from the Innovation investment consultative commitee (ICC) to deliver real value to the industry.

In collaboration with leading research institutions, universities and consultants across the country,

Australian Eggs is facilitating over 15 research projects, that contribute to knowledge of food safety, flock health, biosecurity, welfare, flock nutrition, effect of eggs on human health and nutrition and NextGen solutions to improve efficiencies along the value chain and reduced emissions.

Our goal is for these investment and research opportunities to ultimately assist farmers in being equipped for real-world challenges. If you have an industry challenge or opportunity you'd like to share with us, we would be very pleased to hear from you.

Please read on to learn more about the Innovation team's work and upcoming research.

## Innovation at Australian Eggs

Data & information to guide policy decisions

- Industry challenges
- Emerging diseases
- New production opportunities

→ Research →

- Guidance manuals and on-farm resources
- New or improved farm practices
- Web-based and virtual tools to enhance on-farm efficiency

→ Extension, farmer engagement, and public communications

→ Development →

- Youth initiatives
- Industry education
- Capacity building

→ Enhanced workforce skills and knowledge

## It's now easier to order our resources

Australian Eggs have 30+ manuals, fact sheets, guides and posters which can be delivered free of charge to your farm.

Most of the resources can also easily be downloaded and printed by you.

New resources are being developed throughout the year and are promoted through *Aus Eggs Update* and *Eggstra*, but for a full list check out the new Resource Order Form on our website.

You can also access it on your mobile phone by scanning this QR code.

**Australian Eggs is a not-for-profit company providing research, development and marketing of eggs for the benefit of all farmers regardless of their size, location or farming system.**

Our marketing channels include:

**TV, MAGAZINE, RADIO AND ONLINE**
Advertising and engagement

**SOCIAL MEDIA**
Advertising

## FLOCK LIFE

### PROJECT

#### Floor eggs data analysis and trials

This project aims to identify factors contributing to floor egg production and develop targeted interventions which can be used to minimise floor egg numbers, thereby reducing the associated food safety and economic implications. This project will use data analysis, producer survey and targeted experimentation in the rearing and production environments to identify production and environmental factors that are associated with high levels of floor eggs within a flock. Information from this research will assist egg farmers in creating production environments which are less conducive to floor eggs.

### PROJECT

#### Monitor hen health status with machine vision on free range farms

Free-range farms are an increasing proportion of the Australian egg industry however, they can cause increased risk of disease and injury as hens interact in the outdoor environment. This project seeks to develop a proof-of-concept machine vision system to autonomously monitor hens as they leave and return to the shed, identify abnormal layer hen appearance for the purpose of alerting farmers to signs of ill health that might warrant veterinarian inspection.

### PROJECT

#### Optimising reduced-protein diets for an efficient and sustainable layer production

This project addresses the knowledge gap of the optimisation of reduced protein diets, by exploring the effects of dietary enzyme inclusion on the production performance of laying hens fed reduced-protein diets. The aim is to develop optimal and practical reduced-protein diets for laying hens with improved feed efficiency and litter quality, optimise the digestibility of raw materials to address nutrient loss from the diets and reduce industry reliance on imported materials such as soybean meal thereby improving industry sustainability.



## FLOCK HEALTH

### PROJECT

#### Effects of microbiota "seeding" on gut health and egg production

Extending flocks productive lifespan has been a challenge for the egg industry and remains a priority. This project aims to investigate the "seeding" of gut with beneficial organisms as a potential layer hen management strategy to improve the gut health of hens. The project has been able to establish an effective microbiota 'seeding' methodology and will investigate how gut 'seeding' can alter the gut microbiome during rearing, early and mid-lay and enhance productivity and egg quality.

### PROJECT

#### Investigations of upper respiratory tract infections (URTI)

Upper respiratory tract infections are becoming increasingly common on egg farms costing the egg industry by way of vaccination, medication, and overall productivity losses. Using observations from commercial egg farms, combined with innovative metagenomic technologies, and pathological, bacterial and viral testing, the project aims to find causes of upper respiratory infections and provide the industry with reliable methods to detect, prevent and control URTI in the future.

### PROJECT

#### Extension and communication strategies to improve biosecurity

This project will develop the most appropriate and applicable biosecurity extension and communications strategies that will target small, medium and large segments of the egg industry. The project will identify gaps in knowledge for compliance through a literature review, draw expertise from a working group from all sectors of the industry including regulators, and organise workshops nationally, to provide a roadmap to improve biosecurity compliance throughout all sectors. This will help to reduce the risk of emergency (exotic) and endemic disease outbreaks.

## Genetic restoration to protect Australian poultry against Avian Influenza

The initial stage of research found the chicken genetics that is responsible for High Pathogenic Avian Influenza Virus. This project builds on this important finding, by testing the most appropriate and effective intervention to prevent Low Pathogenic Avian Influenza progressing to HPAI. This project will complete three lab-based trials: first to block expression at the genetic level, and then two supplementation trials, in culture and in vitro.



## FOOD SAFETY

## Review of literature for understanding eggs contamination during cold-chain transportation

This scope of this project is to determine if various lower storage temperatures will mitigate the growth of *Salmonella* Enteritidis and *Salmonella* Typhimurium. The work will involve literature review, use of specific scientific databases, and collaboration with scientists to ensure accurate information is gathered. Potential insight of this project will also determine the root cause of food poisoning when eggs are involved. This project will result into the publication of a peer review report.

## Investigating improved rodent control strategies

Researchers will work closely with industry to develop innovative, economical strategies for efficient rodent management. The strategies will be trialled on participating egg farms and the outcomes and learnings will be communicated to industry. The aim of this project is to find easy-to-implement rodent control strategies which yield beter results than current, common rodent control programs. The adoption of promising strategies will result in reduced rodent populations thus reducing related structural damage incidents, feed loss and contamination and ultimately improve biosecurity and bird health.



## HUMAN NUTRITION

## Effect of Eggs on microbiome, cognition

This project aims to examine the effects of egg intake (2 whole eggs per day for 6 weeks) on the human gut microbiome, and explore clinical outcomes (i.e., cognition, gut sensations) and potential mediating factors (i.e., inflammation regulation) in younger and older adults via a randomised controlled trial. The findings of this novel and innovative research project may be of interest to stakeholders as it hypothesises to debunk the myth of egg consumption increasing malodorous wind.

## Updating grain apparent metabolisable energy (AME) database

Energy is the most expensive component of diet for laying hens. With feed accounting for approximately 65% of the cost of production, accurate estimation of energy content of ingredients, in particular grains, is vital for nutritionists to ensure that feed formulation meets the breed specifications, performance, and least cost objectives in egg production. Direct measurement of AME for each grain sample is not commercially feasible, however a reliable near infrared (NIR) calibration can provide a rapid AME prediction for individual grain samples. The overarching objective of this project is to facilitate rapid, accurate near real-time prediction of AME content of cereal grains for laying hens, thus saving the egg industry cost associated with feed formulation. Improved NIR calibration will materialise in immediate benefits for the egg industry.

## Eggs – top choline source for young children

Recent study has shown that choline, readily available in eggs, is an essential nutrient required during pregnancy and the first two years of life. Insufficient choline intake during pregnancy and early life are associated with a lower IQ in the child. It has been established that 40% of pregnant

Australian women had choline intakes above the NHMRC recommendations (>440 mg/d), however, there is lack of information on the choline intake of children under two years in Australia. This research will identify the best way to improve eggs (and choline) intakes and provide vital information on the percentage of young children meeting NHMRC recommendations for choline intake.



## ANIMAL WELFARE

### PROJECT

### Intelligent real-time monitoring of flock behaviour and welfare

Automated video-based systems will use computer vision and machine learning to identify individual bird behaviours that will help determine whole flock movements and behaviours, while providing real-time information on the proportion of hens eating, drinking, laying eggs etc. This information combined with flock records will provide insights into bird health, welfare, and productivity. Based on the continuous and reliable data generated through artificial intelligence systems on farm, the project aims to deliver a combined flock welfare, production monitoring and early warning system for the industry.

### PROJECT

### Phenotypic and genotypic profiles of hens that pile

This project will provide information to reduce piling and smothering through short- and long-term strategies, which will improve productivity and bird welfare. The project led by University of Melbourne and in partnership with University of Bern and a major breeding company, is part of a larger international project "HenTrack". Information will be generated on phenotypic (observable physical characteristics), and genotypic (genetic constitution) profile of birds that are more prone to piling to inform breeding selection criteria, and/or environmental interventions, which will then be fed back to the Australian egg industry to grow hens that exhibit less piling and smothering behaviour.



## ENVIRONMENTAL SUSTAINABILITY

### PROJECT

### Optimising waste and by-product utilisation and conversion to value streams

This project is an extension of the "Carbon and environmental footprint of the poultry industry" project which will this time quantify, by housing system, the volume of waste and by products produced by the industry. The output of this project will also provide innovative processes in utilising the generated waste and the by-products within the industry as well as opportunities in converting them into revenue streams. A manual with those findings & strategies will be made available to the industry.

### PROJECT

### Sustainable feed for optimal layer life

This is a highly beneficial project which will reduce the carbon footprint, reduce feed cost, and promote layer life. This will be done by replacing soybean meal (SBM) with combination of canola meal (CM) and insect meal (BSFL: black soldier fly larvae). At the end of this project, practical and technical data to formulate commercial diets reduced in both soybean meal and dietary crude protein will be obtained. Moreover, it also creates potential opportunities in focusing on sustainability and transforming human food waste towards the production of 'green' eggs.

### PROJECT

### Carbon calculator tool for the egg industry

Australian Eggs will be producing a spreadsheet-based calculator which will enable farmers to input data to determine their carbon footprint and total on-farm emissions. Egg producers will have a reliable tool to calculate their carbon footprint (Scope 1, 2 & 3 emissions) and their total on-farm greenhouse gas (GHG) emissions (Scope 1 & 2), improving understanding on baseline farm performance and opportunities for improvement. Extension activities such as training/ workshops on how to use the tool and its benefits will be supplied.

## Industry education and capacity building

Australian Eggs partners with a range of registered training organisations to deliver continuing development and education to farm staff, farm managers or owners with the goal of skills and knowledge development and workforce enhancement.

The Industry Education program ranges from short courses to formal and accredited vocational education and training, as well as providing resources that can be used on farm.*

Australian Eggs also provide various scholarships and awards to farm staff, undergraduate students and early career researchers in the egg industry.

Some of these awards include:

- **Jeff Ironside Egg Industry Leadership Award** to participate in the Marcus Oldham Rural Leadership Program in Victoria

- **Australian Eggs Management Trainee Program** take the Certificate IV in Leadership Management

- **Horizon Scholarship** for undergraduate students

Australian Eggs remain committed to ensuring that egg industry workers develop the technical knowledge as well as leadership and management skills required to advance on egg farms and in the egg industry supply chain.

---

\* Some of the education courses available include:

- **Egg Tasters**

- **Egg Start**

- **Certificate III in poultry production**

- **Certificate IV in Leadership and Management**

- **Certificate IV in Agriculture** (poultry, biosecurity, and animal welfare training)

- **Diploma in Agriculture**

---



Scan the QR code to read more about **Industry training and capacity building**

## Youth Initiatives

The Youth Initiatives project provides teaching and learning resources to teachers, educators, and schools to promote school education of eggs and egg production. The initiative also demonstrates the variety of career opportunities within the egg industry as well as the pathways to join the sector.

Education resources which are currently being updated to the Version 9 of the Australian teaching curriculum are available on the All About Eggs Website with downloadable card games, posters, career development resources, webinars, and virtual reality career tours.



Scan the QR code to read more about **Youth initiatives**

## Extension

Australian Eggs facilitates a range of activities to extend and support the adoption of new knowledge and technology to farmers. Extension programs are designed to reflect industry priorities, by identifying and responding to common and emerging issues.

In 23/24, our extension program will focus on:

- Disseminating research outcomes and capturing industry priorities through farm visits, workshops and webinars

- Developing on-farm information resources in the form of easy-to-read fact sheets, flyers, manuals and videos

- Developing practical web-based or virtual tools to enhance on-farm efficiencies and productivity

- Continuing the Egg Production Network (EggNet) sessions for ongoing exchange of knowledge and expert's opinions on production issues within the industry.

For more information go to **australianeggs.org.au**