DairyUP
Unlocking potential

Getting more milk from cows

Cows tend to produce more milk with each lactation. But cows in Australian dairy herds are young. Only 10% of cows produce milk for five lactations or more and about 60% of the average national milking herd has calved twice or less.

Optimising the productive life of dairy cows ensures dairy farm businesses receive the best return on their investment from rearing the calf; it also increases milk production and reduces the environmental footprint of individual cows.

Cow longevity research

This project aims to keep the best dairy cows in herds for longer by predicting and preventing the diseases that contribute to early culling.

The reasons for cow culling in 30 dairy herds are being recorded. The data is being combined with blood test information from the dry period and in the lactation of selected cows to better understand why cows are culled.

Unlocking the potential of cows

Dairy UP's P2 project aims to unlock the potential of dairy cows to achieve their genetic potential under NSW conditions.

P2 is a suite of seven projects that collectively explore ways to profitably increase both productivity and wellbeing in commercial settings.

P2a: Cattle Longevity: Age and Parity & Intensive Herds

P2a: Longevity: Future

P2b: Early Alerts

P2c: Milk as a Diagnostic Tool

P2d: Facility Design for Cow Comfort

P2e: Calf Husbandry

P2f: Infectious Diseases ('Infectome')

P2g: Heifers Early Calving

This document provides an update on P2a Longevity.

Benefits

Retaining the best dairy cows in herds longer is expected to make dairy businesses more profitable and less risky.

Studies have proven older cows can produce 16% more milk than their younger counterparts. Keeping more, older cows in the herd would mean dairy farmers would need about 8% fewer replacements so they would have young stock to sell as an additional income stream.

Thanks to technology such as sexed semen and fixed time artificial insemination, retaining more older cows could also provide the opportunity for a dairy business to produce more dairy-beef.

Increasing the proportion of older cows in a dairy herd would also ensure that dairy farm businesses receive a return on the investment in rearing these calves. A full return for the cost of rearing a dairy heifer often isn't realised until she calves for a third time.

From an industry and farm perspective, reducing the "wastage" of older cows is good news for dairy's environmental footprint. The more milk a cow produces for its lifetime, the less its environmental emissions intensity.

In addition, there's expected industry "social license" benefits from optimising the longevity of dairy cows.

Research approach

This project combines information from existing large cow data sets with real-world, extensive monitoring of up to 30 Australian dairy herds.

Half of the 30 Australian herds included are pasture based, the rest run intensive systems.

These herds are supplying herd test and farm management records for monitoring.

Researchers provide these farms with specific termination codes to input into their farm software to provide additional detail about the cause of individual cow culling.

Blood samples are being taken from certain cows at various times throughout its to provide additional health information and potentially identify biomarkers indicating illness.

The initial dataset for this analysis includes detailed health and reproduction data from 36,000 cows across 13 countries including Australia, Canada, and the United States of America.

Researchers are analysing this data set at an individual cow level, searching for key disease risk factors.

Herd records and information from Datagene is also being used in this analysis.

On farm monitoring

Blood samples were being taken from six cows from each age group per farm.

For example, six cows that have had their third calf, six that have had four calves etc.

The samples are being taken twice including 50 to 20 days before calving and 40 to 70 days after calving – at peak milk. Cows were also weighed and body condition scored.

This information will underpin the researchers' metabolomic investigation.

Metabolomics involves the large-scale study of small molecules called metabolites within each cow which could provide information about disease.

Progress update (November 2023)

Researchers have collected 2000 blood samples and collated information from 30 herds to create a database with 100,000 cow records.

This Australian database is a one of a kind.

It's the only database in the world that includes extensive detail about the reasons why cattle are removed from herds as well as disease and reproductive information.

This information is underpinning further Dairy UP research (P2g heifers early calving) where Holsteins – and their ability to hit critical mating weight earlier – are being studied to increase cow longevity.

This Australian longevity research was featured as part of a Discovery Conference for the American Dairy Science Association in Chicago, USA in October 2023.

Early findings

Initial findings from the 36,000-cow data analysis provided a clearer understanding of the reproduction and disease challenges facing older cows. Some findings included:

- The odds of milk fever and other metabolic

diseases (including retained placenta, mastitis and lameness) greatly increased as a cow had more calves. For heifers, there was increased risk of calving difficulty and metritis.

- Cows that have had five or more calves are 2.5 times less likely to be mated than cows that have had one calf, while both high and low producing cows are at a greater risk of reproductive failure, but especially for failure to become pregnant in a lactation.

Next steps

Priorities for the coming year include examining critical mating weights for Holstein heifers and how breeding heifers early could contribute to cow longevity.

Collaborators

The P2a project is a collaboration between researchers from Dairy UP, Scibus, DataGene and the 30 participating commercial farms. Charles Sturt University is a collaborator and work is supported by the Leslie Manor Trust and Eagle Direct.

This project is closely linked with the following Dairy UP projects:

- P2a Cattle longevity: Age and Parity and intensive herds.
- P2g Heifers early calving.

The following PhD students are contributing to the body of knowledge around longevity:

- David Sheedy
- Andrew Lean

Read more

- Holstein dairy cows lose body condition score and gain body weight with increasing parity in both pasture-based and total mixed ration herds, JDS Communications, November 2022
- Associations of parity with health disorders and blood metabolite concentrations in Holstein cows in different production systems, J. Dairy Sci. 106:500–518
- Increased parity is negatively associated with survival and reproduction in different production systems, Journal of Dairy Science.

More info

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Delivery organisations

Partner organisations

Additional program supporters, collaborations or partnerships

Charles Sturt University | DairyBio | DataGene | Eagle Direct | Entegra
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