



Why age of first calving matters

The age that dairy heifers calve into a milking herd for the first time can play a significant role in their health and welfare and the economics of a dairy farm business.

Australian dairy farmers with seasonal/split calving systems generally aim to calve their cows at about 2 years of age. In some Australian dairy herds, the actual age of first calving is closer to 3 years.

While it is possible to breed heifers to calve at less than two-years-of-age – and some dairy farmers do – there's limited research regarding the best age of first calving and what this means for the heifer across her lifetime and how this contributes to her return on investment.

Pros and cons of calving younger

The benefits of breeding Holstein dairy cows earlier have long been debated and weighed-up against the perceived risks of calving a heifer at a younger age.

The main benefits include earlier return on investment in breeding replacements, fewer unproductive animals on farm, improved lifetime production, improved reproductive performance, reduced generation interval (faster genetic gain)

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 P2g: Heifers early calving.

and marked reduced greenhouse gas (GHG) emissions intensity by producing more milk across an animal's lifetime.

Potential issues with calving cows younger include calving difficulties, fatty udder syndrome, lower production and joining poorly-grown heifers.

Demystifying the global research

Research has found that traditional concerns about calving heifers earlier, such as increased calving difficulties, fatty udder syndrome and decreased production, are largely unfounded, under optimum farm and animal management conditions.



For example, research has demonstrated an improvement in calving ease for heifers with an age of first calving of 18-22 months. Alternatively, those with an age of first calving at 26-months or more have an increased risk of calving difficulties – mostly attributed to a higher body condition score and excess fat. Fatty udder syndrome can be overcome if heifers are fed adequate protein in their diet.

Lower production in a heifer's first lactation – potentially due to earlier calving – also isn't a concern because her lifetime production is greater, and she has less "unproductive" time.

This project

This project is investigating the effects of age at first calving and other environmental influences on dairy cow longevity and lifetime production: including:

- Age at first calving and its effect on production, health and reproduction; differences between extensive and intensive systems.
- Hormonal and/or metabolomic influences at or around puberty.
- The effect of early breeding and calving on health, production and reproduction in the first lactation.
- Microbial enhancers used in compost barns to improve quality of bedding and its impact on cow behaviour.
- Effects of nutrition and environment on production, health and reproduction of housed cows.

This fact sheet reports on the early findings of the first point above investigations into the effect of age of first calving on production, health and reproduction.

Benefits

The findings from this research will provide a clearer understanding of what age is best for a Holstein heifer to calve for the first time.

This will enable dairy farmers to focus on

growing-out their heifers – with optimum nutrition – to ensure they meet target breeding weight at this ideal age.

The findings should also provide clearer direction for the management of heifers and breeding plans, including fixed time AI programs.

In addition, this research should determine the return on investment for heifers and quantify the cost of "unproductive" animals on the farm – those that aren't producing milk.

Other benefits could also include understanding when to alter the age of first calving for improved economic returns. For example, when the farmgate milk price is low or if the cost of rearing calves is high.

Research approach

This project involves analysis of industry and herd data records, the collection and analysis of blood and feed samples, and controlled clinical trials with different housing systems.

A global literature review underpinned the first stage of this DairyUP project. Understanding the age of first calving in other dairy farming countries provided context for Australia's results and a guide for what's possible – including the economics of what a change in the age of first calving could mean.

On-farm research, across 6 farms is monitoring and comparing two groups of heifers bred at different ages. These heifers are being monitored throughout their pregnancy and for at least their entire first lactation, if not, their entire life.

On farm monitoring

This project is monitoring, and comparing, a total 429 Holstein heifers across two groups, bred at different ages, from 6 dairy farms. These dairy farms are already in the Dairy UP database and include 15 intensive operations – a mixture of free-stall and bedded pack barn – as well as 15 pasture-based operations.

The first heifer group was bred from 11 to 13 months-of-age and the second heifer group was bred from 13-15 months-of-age. All heifers were



bred at a minimum 330kg.

In addition to monitoring the pregnancies of these heifers, additional testing includes reproductive tract scoring, targeted blood tests, and hormone influences. These blood tests will examine protein pathways, levels of the leptin hormone other hormones such as LH and IGF-1.

Progress update (May 2024)

The global literature review has found the average age of first calving around the world is generally 24 to 28 months. In the Australian Dairy UP database herd, the age of first calving for intensive dairy systems was about two years old or 24 months, slightly younger than pasture-based, extensive systems with a 26.5 months-old median age of first calving.

Researchers for the on-farm trials are awaiting heifer pregnancy confirmations. It's only early in the research but initial data suggested a higher pregnancy rate in the group of heifers bred at 12 months-of-age, compared to those bred at 14-months-of-age or older. Of heifer results on one farm, there were 76 heifers in the 12-months-old group, of which 56% were pregnant at the beginning of May. Up to 48% of the 54 heifers 14-months-of-age or older were pregnant at the same time.

Next steps

Priorities for the coming year include monitoring and collecting data on the heifers in the on-farm trial throughout their pregnancy, calving and first lactation.

PhD student

Andrew Lean

Collaborators

The P2g project is a collaboration between Dairy UP, Scibus, the University of Sydney and Charles Sturt University.

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

- [P2a Cattle Longevity](#)
- [P2d Facility Design for Cow Comfort](#)
- P2e Calf Husbandry

Further reading

Ettema, J. F., & Santos, J. E. P. (2004). Impact of Age at Calving on Lactation, Reproduction, Health, and Income in First-Parity Holsteins on Commercial Farms. *Journal of dairy science*, 87(8), 2730-2742. [https://doi.org/10.3168/jds.s0022-0302\(04\)73400-1](https://doi.org/10.3168/jds.s0022-0302(04)73400-1)

Hutchison, J. L., Null, D. J., Bickhart, D. M., Cole, J. B., & VanRaden, P. M. (2017). Genomic evaluation of age at first calving. *Journal of dairy science*, 100(8), 6853-6861. <https://doi.org/https://doi.org/10.3168/jds.2016-12060>

Krpalkova, L., Cabrera, V. E., Vacek, M., Stipkova, M., Stadnik, L., & Crump, P. (2014a). Effect of prepubertal and postpubertal growth and age at first calving on production and reproduction traits during the first 3 lactations in Holstein dairy cattle. *J Dairy Sci*, 97(5), 3017-3027. <https://doi.org/10.3168/jds.2013-7419>

Project lead

Dr Andrew Lean

email: andrewl@scibus.com.au

Delivery organisations



Partner organisations



Additional program supporters, collaborations or partnerships

Charles Sturt University | DairyBio | DataGene | Eagle Direct | Entegra
Macquarie University | NSW EPA | smaXtec | UC Davis | University of Technology Sydney