

Combining fresh and early lactation grain supplementation strategies to optimise profitability in grazing dairy cows

First 100 days - Factsheet 7

Key points

The grain mix type and rate fed to dairy cows in the first 100 days in milk has a carryover effect on milk yield and cow profitability in later lactation.

When canola meal was included in the grain mix, cows ate more pasture and produced more milk throughout early lactation than cows fed wheat at the same rate of feeding.

Feeding individual cows differing amounts of grain from 22 days in milk onwards based on their milk income minus feed costs did not provide any additional advantage in terms of overall herd milk yield or profit, compared to feeding the same amount of grain to all cows in the herd.

Introduction

The Dairy Feedbase First 100 Days project investigated early lactation feeding strategies to increase dry matter intake and peak milk yield, with the expectation that carryover benefits for milk production across the rest of the lactation would also be observed. The research looked at several different grain supplementation strategies across two distinct periods in early lactation:

- The fresh cow period: Approximately 1–21 days post calving.
- The early lactation period: 22 days up to 130 days post calving.

On most Australian pasture-based dairy farms, cows are supplemented with concentrates during these two periods. This is to optimise milk production and boost dietary energy intake during and beyond the negative energy balance phase, which typically lasts for the first 70 to 80 days in milk.

The fresh cow experiments outlined in Factsheet 1 and Factsheet 2 of this series have described the dry matter intake and milk production benefits of feeding maize grain in combination with canola meal in the first 21 days of lactation, compared with feeding wheat grain alone.

The First 100 Days research has also provided substantial evidence that grazing dairy cows can be programmed to produce more milk later in the lactation by feeding maize grain and canola meal, instead of wheat grain, in the first three weeks post-calving.

In addition, a wheat grain, barley grain and canola meal mix offered to cows in early lactation from 22 days in milk onwards has repeatedly been shown to increase dry matter intake of grazed pasture and consequently milk production when compared to feeding wheat or barley grain at the same rate.

This final grain supplementation experiment of the First 100 Days project combined the best fresh period feeding strategies with the best early lactation feeding strategies from the earlier experiments, to try and establish the most profitable overall option.

Experiment outline

Seven treatments were tested – one control treatment where wheat was fed immediately post-calving to 100 days in milk. Six further variations were trialled, where two different combinations of maize grain and canola meal were fed to cows during the fresh period, and subsequently three different rates of a wheat grain, barley grain and canola meal mix were fed from 22–100 days in milk as shown in Figure 1.

Cows allocated to the Profit treatments were initially offered 7 kg DM/cow of grain mix with the amount increased or decreased by 1 kg DM once per fortnight for every cow depending on projected profit (milk income minus the cost of grain mix) of each individual cow.

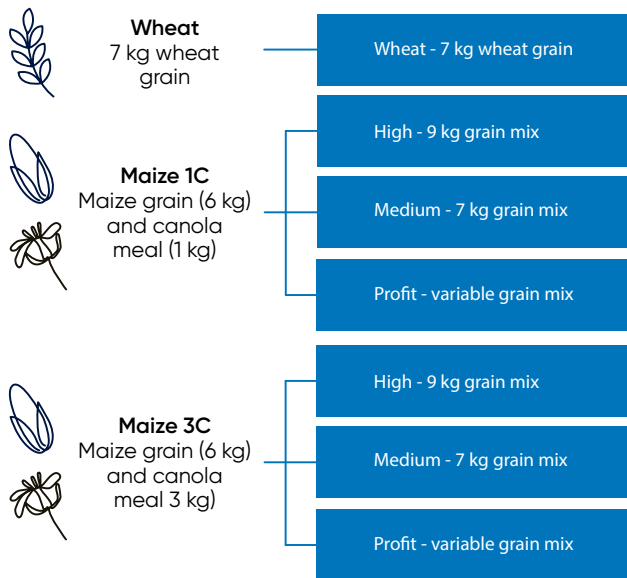


Figure 1 Diagram of treatments and amount of grain mix offered in kg of dry matter – treatments on the left represent the fresh period (1–21 days in milk) and blue boxes from 22–100 days in milk.

Milk production results

In the fresh period, daily energy corrected milk* production was higher for cows offered the Maize 1C (35.0 kg/cow) and Maize 3C (36.7 kg/cow) treatments than cows offered wheat only (32.8 kg/cow).

*Energy corrected milk is milk yield standardised for a uniform level of fat and protein.

Figure 2 shows daily milk yield per cow for the three fresh period treatments when the same amount of supplement (7 kg DM/cow) was fed from 22–100 days in milk for all cows. There was little difference in milk yield throughout the lactation between cows that had been fed the Maize 1C or Maize 3C fresh period diets indicating that there was no additional advantage from feeding the higher level of canola meal. Figure 2 also shows that cows fed both combinations of maize grain plus canola meal in the fresh period followed by a wheat grain, barley grain and canola meal mix in early lactation, performed better than cows fed only wheat throughout at the same rate of feeding. This supports the findings from previous experiments.

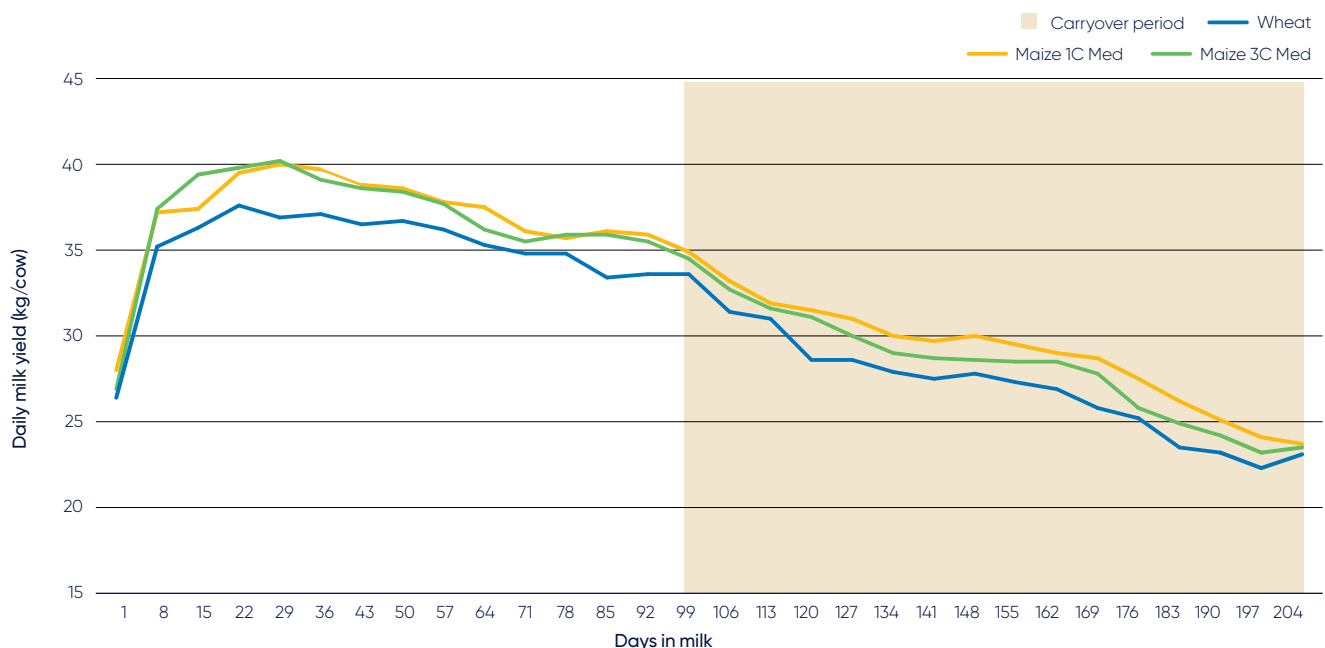


Figure 2 Average milk yield over 200 days in milk of cows fed the 1) Wheat treatment, 2) Maize 1C in the fresh period followed by the Medium early lactation diet or 3) Maize 3C in the fresh period followed by the Medium early lactation diet.

Figure 3 shows average daily milk solids yield produced per cow across the fresh and early lactation periods for all treatments. Cows on the wheat control treatment produced substantially lower milk solids than cows offered the other treatments while there was no difference between the High treatments compared to the Medium and Profit treatments despite these cows receiving approximately 2 kg DM less grain per cow from 22–100 days in milk.

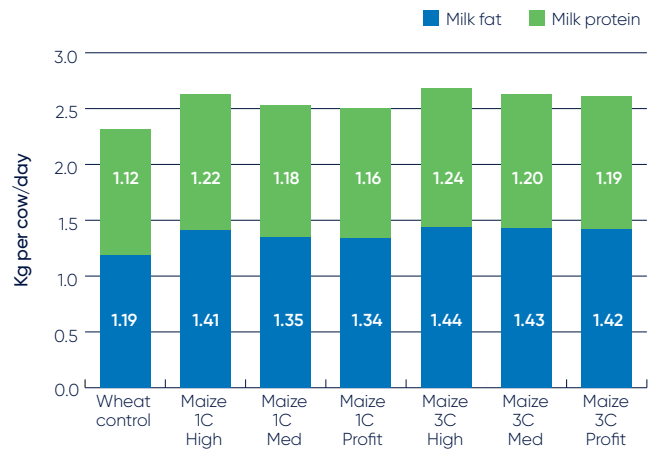


Figure 3 Average daily milk solids (milk fat plus protein) yield per cow from 1–100 days in milk for each treatment.

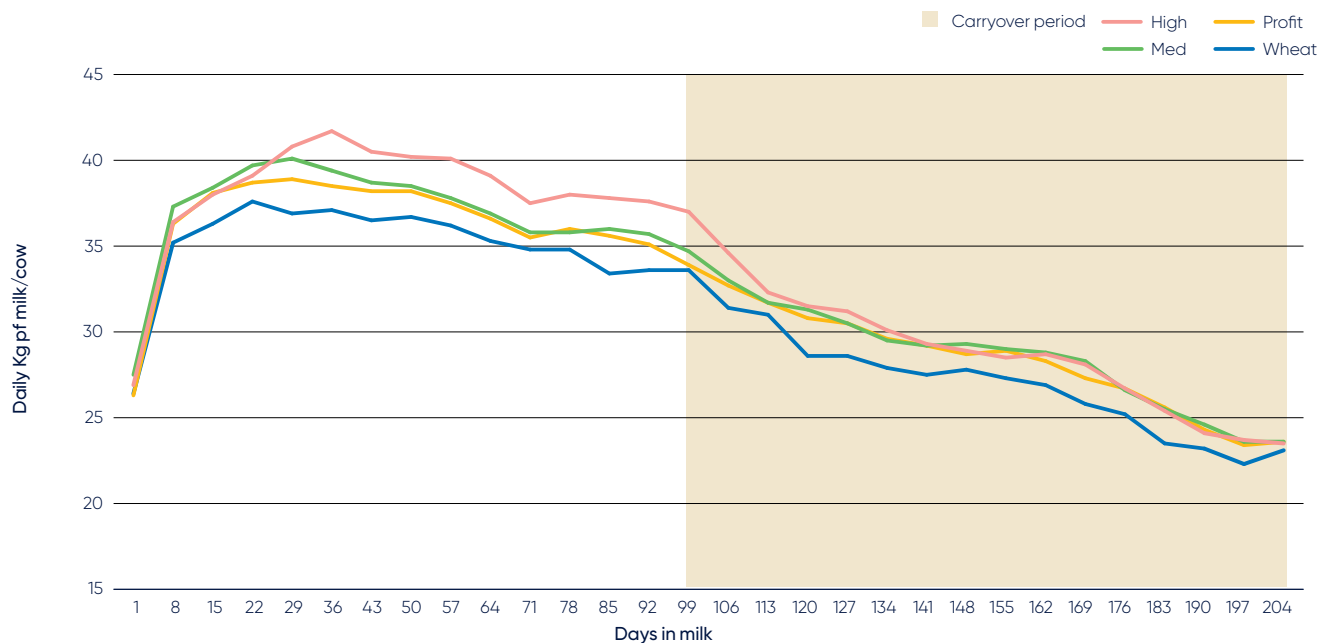


Figure 4 Average milk yield of the combined High, Medium and Profit treatments compared to control cows that were offered wheat grain only.

Figure 4 shows the mean daily milk yield for the High, Medium and Profit treatments over the 200 days in milk, irrespective of whether they were fed Maize 1C or Maize 3C in the fresh period.

It is clear from Figure 4 that the Profit treatment had no milk yield benefit over feeding a flat rate of grain mix at a similar rate (Medium treatment); the daily concentrate intake did not differ between cows on the Medium and Profit treatments (both 7 kg DM/cow).

This aligns with earlier experiments in First 100 Days project and suggests that pasture-based dairy farmers will not gain additional benefits from implementing more complex differential feeding strategies at the individual cow level.

As expected, the cows on the High treatments from 22–100 days in milk produced more milk than cows on the Medium treatments, but also consumed 2 kg DM/cow per day extra grain during this time.

Pasture intake measurements, taken over five days from 40–45 days in milk, showed that all cows on the maize grain and canola meal fresh period treatments that subsequently received the wheat grain, barley grain and canola meal mix in early lactation, consumed more grazed pasture than the wheat control cows. This again is consistent with earlier results and showed that the inclusion of canola meal in the grain mix stimulates increased intake of pasture at these levels of grain supplementation.

During the carryover period (100–200 days in milk) all cows were fed the same type and amount of grain. During this period, the milk production for the cows that were in the wheat only treatment continued to be lower than cows that had been in all other treatment groups.

Economic analysis

The economic analysis used a milk price of AU\$6.37/kg of milk solids (AU\$9.09/kg protein and AU\$4.13/kg fat), a six-year average price at the time of the experiment (2022). The wheat mix was just under \$100/t DM cheaper than the maize grain and canola meal mixes used in the fresh period, while the wheat grain, barley grain and canola meal mix used from 22-100 days in milk was approximately \$20/t DM more expensive than the wheat alone.

Cows offered either of the maize grain plus canola meal treatments in the fresh period were more profitable than cows fed wheat only. During the fresh period, the Maize 1C and Maize 3C diets were \$0.94 and \$1.10/cow per day more profitable than the Wheat treatment.

The combined effect of the fresh and early lactation period diets was varied, but all were more profitable than the Wheat control diet over the first 100 days in milk, as shown in Figure 5.

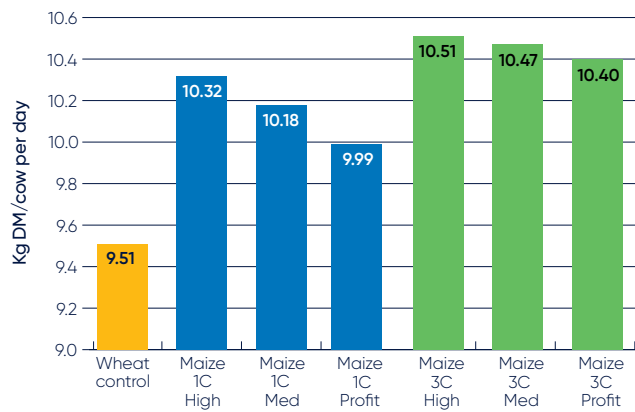


Figure 5 Milk income minus total feed costs from 1-100 days in milk.



Key outcomes

- 1 In the fresh period, milk production was higher for cows fed a mix of maize grain plus canola meal compared with cows offered wheat grain only.
- 2 There did not appear to be much additional benefit from including a high level of canola meal, when feeding maize grain in the fresh period (Maize 3C treatment), above a lower level of canola meal (Maize 1C treatment).
- 3 Offering cows a fresh period diet of maize grain plus canola meal followed by a wheat grain, barley grain and canola meal mix in the early lactation period was more profitable than feeding wheat grain alone at the same rate. The advantage persisted in the carryover period from 101-200 days in milk indicating that the effect of grain type fed in the fresh and early lactation periods is still evident later in the lactation.
- 4 As shown in previous experiments, canola meal supplementation stimulated higher dry matter intake of pasture and higher milk yield and milk solids production.

Disclaimer

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