



DAIRY HERD FERTILITY

CHALLENGE NOTE A - Extra Profit from Improved Herd Fertility

Poor fertility in dairy herds results in extended calving intervals and increased culling of cows not in-calf. This is estimated to cost the UK dairy industry £500 million per year. The aim of this Challenge Note is to quantify the costs of poor fertility in Northern Ireland dairy herds and highlight opportunities for the dairy farmer to improve herd financial performance.

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The Costs of Infertility

The estimated loss from infertility to the dairy farmer arises from:

- Reduced annual milk sales from longer calving intervals;
- Reduced calf output and sales;
- Cost of veterinary treatments;
- Increased semen use.
- Cost of replacing cows culled not-in-calf;

In addition there are costs of poor fertility that are difficult to quantify. These include the efficiency of labour use with spread calving, calf rearing and breeding, and the management difficulty of dealing with groups of cows at different stages of lactation throughout the year.

Ideal Calving Interval

Confusion often arises among farmers over what the ideal calving interval is for their herd. Compare the fertility performance of the two herds shown in Table 1. Which herd has the best fertility?

Table 1:
Calving interval and replacement rate

	Herd A	Herd B
Calving index (days)	370	390
Culled not-in-calf (%)	15	5

Conventionally, we would presume that Herd A has the best fertility given that it has the lower calving index. However, calving index is a crude measure of fertility performance as it ignores cows that do not calve again. Cows culled not-in-calf are one of the largest costs of poor fertility as they incur higher replacement costs.

Table 2: Financial cost of calving index versus replacement rate.

	Herd A	Herd B
Calving Index (days)	370	390
Extra calving index cost (£)	£755 (5 days x 100 cows x £1.51/cow/day)	£4300 (25 days x 100 cows x £1.72/cow/day)
Replacement rate (%)	15	5
Extra replacement rate cost (£)	£10,950 (15 cows @ £730/cow)	£3,650 (5 cows @ £730/cow)
Total infertility cost (£)	£11,705	£7,950
Extra herd infertility cost (£)	£3775	

If we assume that the herds in Table 1 each have 100 cows, Herd A culls 15 cows not-in-calf each year to achieve a calving interval of 370 days. Replacement heifers entering the dairy herd cost £830 each, produce less milk in their first lactation (worth £170) and cull cows are worth only £270. Therefore each cow replaced costs £730 (see Challenge Note B: **The Cost of Replacing Cows Culled Not-In-Calf** for details).

Herd A has replacement heifer cost of £10,950 per year - £7,300 more than Herd B (see Table 2). The longer calving index in Herd B also has a cost as daily and annual milk yields are reduced. This is estimated to cost £1.72/day for the first 25 days of extension beyond 365 days for an 8000-litre herd while the 5-day extension in Herd A is estimated to cost £1.51/day. This is based on calculations from the University of Reading with Northern Ireland costings (see Challenge Note C: **The Cost of Extended Calving Intervals** for details).

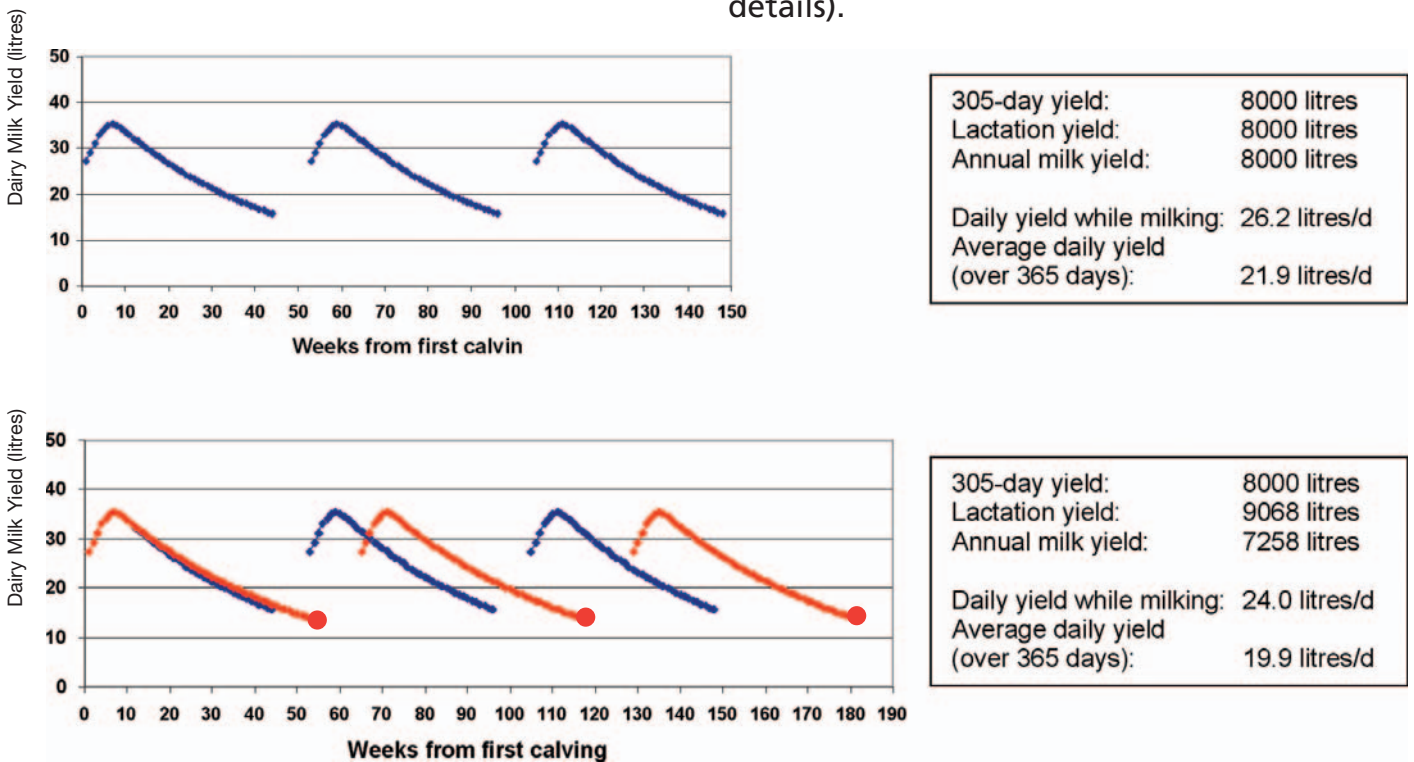


Figure 1: Example of how cows with an extended lactation have a lower annual yield. Both cows have a 305-day yield of 8000 litres but Cow A calves every 12 months and has less late lactation milk production than cow B calving every 15 months (Source: InCalf Report, Australia).

The Impact of Extended Lactations on Herd Performance

Why do cows with extended lactations have a lower annual milk yield than cows calving on an annual basis? Compare two cows with a 305-day milk yield of 8000 litres. Cow A calves every 12 months while Cow B calves every 15 months. The lactation curves are shown in Figure 1. Cow B with longer calving interval will spend a larger proportion of time in late lactation when daily production is lower (circled red). The average daily milk yield for Cow A across the entire lactation is 26.2 litres per day (8000 litres/305 days), while Cow B with a longer calving interval will only produce an average of 24.2 litres per day (9068 litres/378 days). Annually, Cow A will produce 8000 litres while Cow B will produce only 7258 litres per year.

Herd A has an annual calving index cost of £755 while Herd B has an annual calving index cost of £4,300 - £3,545 more than Herd B (see Table 2).

The overall infertility cost in Herd A (370-day calving index) is £11,705 per year, while it is £7,950 in Herd B (390-day calving index). Therefore, despite having a higher calving index, Herd B has the lower infertility cost (£6,650 less) due to fewer cows being culled not-in-calf.

This means that while farmers should strive to re-breed cows to achieve short calving intervals, they should avoid culling valuable cows simply to maintain a short calving index.

Production is lower (circled red). The average daily milk yield for Cow A across the entire lactation is 26.2 litres per day (8000 litres/305 days), while Cow B with a longer calving interval will only produce an average of 24.2 litres per day (9068 litres/378 days). Annually, Cow A will produce 8000 litres while Cow B will produce only 7258 litres per year.

How does this affect herd production? Consider two herds of 100 cows - Herd A has 100 cows calving every 12 months similar to Cow A in Figure 1, while Herd B has 100 cows calving every 15 months similar to Cow B. If both herds were calving all year round, the average number of days in milk at a typical herd milk recording day for cows in Herd A would be around 150 days while the average for Herd B would be around 190 days. Herd A will produce over 74,000 more litres annually, because the cows are spending more time in early and mid lactation and less time in late lactation.

Greenmount Campus Dairy Benchmarking

Local Northern Ireland results show the relationship between annual and 305-day milk yields. Calving interval and 305-day milk yield data was obtained from farmers participating in the Dairy Benchmarking Programme. Figure 2 shows the relationship between annual yield and 305-day yield. In general the higher the 305-day milk recorded yield, the greater the discrepancy between the annual yield and 305-day yield with annual yields being lower.

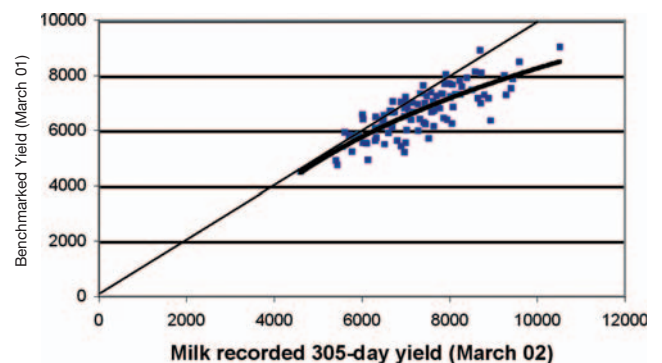


Figure 2: Annual vs 305-day milk yield (Source: Greenmount Campus Dairy Benchmarking).

Breeding Options

The options to improve fertility through breeding vary widely according to level of production:

- In very high yielding herds (>9000 litres), use of a high PIN Holstein-Friesian bull with a positive PTA for fertility is the only real option, though the bulls choice will be limited;
- In moderately high yielding herds (7000-9000 litres) the use of a Holstein-Friesian bull with positive PTA for fertility is obvious, although there may be potential to switch to an alternative breed or crossbreed;
- In low-moderate yielding herds (<7000 litres) there is more flexibility for the use of alternative breeds or crossbreeding.

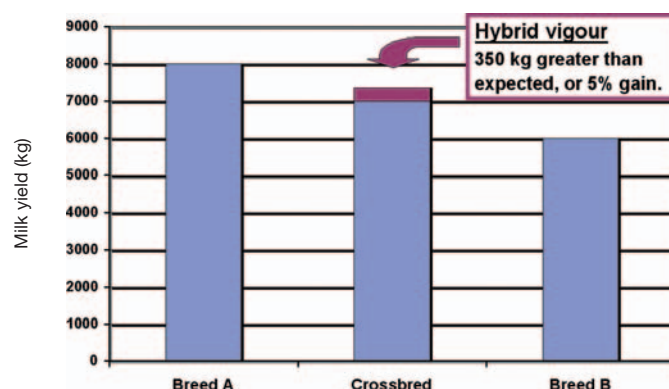


Figure 2: Example of hybrid vigour.

Table 5: Production and fertility performance of Holstein-Friesian and dual purpose breeds in a grass-based spring-calving production system in the Republic of Ireland.

	High Merit Hol-Fr	Medium Merit Hol-Fr	Montbeliarde	Normande
Milk yield (kg)	5994	5321	5119	4561
Fat (%)	3.90	3.75	3.81	4.00
Protein (%)	3.39	3.36	3.49	3.60
Days to first service	71.5	70.9	64.9	67.7
3-week SR%	75.2	83.9	87.6	83.8
Days to conception	99.0	87.3	82.1	82.9
Conc. Rate (%)				
- 1st ser.	37.2	42.3	50.4	56.6
- 2nd ser.	42.5	43.4	49.3	46.4
No. services/cow in group	2.79	2.39	1.99	1.82

Source: Teagasc Moorepark

Summary

- There are various breeding options available to improve the future fertility of your herd.
- Selection of bulls using their PTA for fertility will be possible from 2005.
- Alternative breeds and crossbreeding can offer better fertility, but at the expense of production.
- Crossbreeding is easier to adopt in practice and introduces hybrid vigour.