Gateway Gazette
Dairy Newsletter.

Issue 58 | February 2022

Hopefully you all had a great Christmas break and you're seeing some good grass and scanning results coming through. You will see the 'second half' of the clinic is looking more like a building and less like a building site so we're excited to get moving soon. Filming is in full swing for Nina's Country Calendar appearance so we'll look forward to that being aired in the coming year!

Crossbreeding – Where to now?

Charles Burgess BVSc

The phenomenon of hybrid vigour (or heterosis) is well known and has been widely exploited across animal and plant agriculture for many years. In 1876, Charles Darwin noted how cross-pollinated plants appeared to be more vigorous than their self-pollinated counterparts. This prompted researchers in the US to investigate the superior growth of F1 hybrid maize. They called this superior growth Heterosis – *When two different breeds are crossed the resultant offspring tends to perform better than the average of the parents.*

Crossbreeding also offers the advantage of complementarity, whereby the desirable points of different breeds may be combined, while masking the bad points.

The NZ dairy industry has benefited greatly from crossbreeding. Je-HF cows are now the most numerous dairy cow, and the Kiwicross has been established by LIC as a breed in itself.

This has been an enormously successful cross in pasture-based systems for a few reasons.

- The hybrid vigour effect is large because the breeds involved have little in common genetically. Much less hybrid vigour would be observed in a Holstein-Ayrshire cross for example, because they are more closely related.
- Not all traits express the same degree of hybrid vigour. More hybrid vigour is seen in traits like fertility, longevity, feed efficiency and disease resistance; areas where the Holsteins were lacking.
- The characteristics of each breed complement each other very well. High yielding Holstein, high milk fat Jersey.

However, it can be difficult to know what to breed first generation (F1) cross animals to, and although we see 100% of the hybrid vigour effect in the F1 cows this begins to fall in subsequent generations (F2, F3, etc). Once stable, between 50 and 66% of hybrid vigour will be maintained depending on whether the farmer breeds crossbred to crossbred or backcrosses, rotating each year between one of the parent breeds.

Genetic theory suggests that by introducing a third breed to a 2-breed program hybrid vigour can be maintained at 86% and further complementary traits introduced. A retrospective analysis of Australian herds found that the number of farmers utilising 3-breed cross systems is growing. This study also found that 3-way cross cows performed better than the backcross of a HF x Je-HF or Je x Je-HF.

Genetics companies have also taken notice of the potential of 3-way breeding systems. Developed by Danish and French companies, ProCROSS combines Holstein, Viking Red and Montbéliarde genetics. ProCROSS cows have shown superior economic results in high production systems through better feed efficiency, fertility, and longevity. Here in NZ, Samen are pushing their Viking Red genetics as the final piece of the 3-way puzzle.

Crossbreeding – Where to now?

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3-way rotational crossbreeding programme – 86% of heterosis will be maintained

But beware. Introducing a third breed is no silver bullet and might be a good way to complicate herd management. A 2020 spring calving Irish study compared HF, Je-HF and a 3-way cross, produced by mating F1 Je-HF cows with a Norwegian Red sire. No fertility benefits were seen from crossbreeding and the 3-way cross cows produced less milk solids. It was concluded that when herd performance, particularly reproduction, is already gold standard crossbreeding is unlikely to lead to improvements. However, the study did not consider other potential benefits such as longevity or increased value of culls and calves. And perhaps conditions on a research farm are too optimal for the resilience of crossbreeds to shine through.

If you're thinking of adding some colour to your shed with a splash of Abondance or a dash of Fleckvieh, consider what breed may suit your system. Also ask if the new breed has been making enough genetic progress so you can continue to improve your herd year on year.

Thiamine (Vitamin B1) deficiency in Calves

Rachel Macleod BVMS

Thiamine/B1 deficiency is the most common disease of weaned calves in some areas of New Zealand, and yet the exact mechanism is not always known.

Most vitamins can't be synthesized in the body so need to be provided through supplementation and diet. Ruminants rely on the bacteria in their rumen to produce vitamins, and it all depends what they're eating. The rumen is a key part of how the animal functions and lives, and it needs a healthy population of microbes to perform its many functions. Vitamin B1 plays a vital role throughout the whole body.

Deficiency occurs when rumen bacteria produce an excess of thiaminases which break down Vitamin B1 in the rumen. The offending bacterial population is elevated by diet changes, plant sources and high sulphur levels. Clinical signs are often seen when calves are moved from stalky to lush green pasture but can occur at any time. Gut parasites have been linked to deficiency, due to the fact that the parasites destroy the gut lining and reduce absorption of nutrients. There is also evidence that high doses of levamisole can cause toxicity and delayed signs of B1 deficiency 2-3 weeks later. It is clear that there are still unknown factors leading to disease and many theories have been circulated, scientists continue to debate so watch this space.

What do you see?

- **Acute:** blindness, down calves and seizures
- **Slower onset:** Isolation from the group, decreased appetite, weight loss, twitching, dehydration, weakness or incoordination, and possible head angled in an upwards position known as star-gazing (photo).

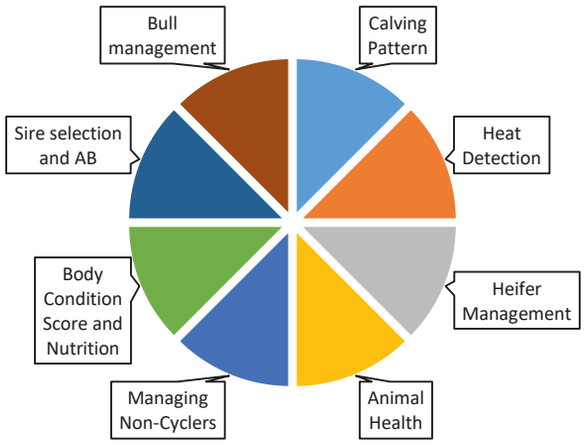
Treatment involves injections of Vitamin B1. If caught early enough they usually respond really well, but response to treatment is usually poor once the calf is down and showing severe neurological signs - irreversible brain damage has often occurred at this point.

Prevention is always the better than cure, and a lot revolves around introducing to new diets and pastures gradually, as well as consistent but accurate drenches based on weights. Thiamine hydrochloride (Vitamin B powder) can be given as an oral drench as a preventive on a mob level, it lasts for about 30 days, which can help around weaning time. It has been shown that dietary supplementation of thiamine in lactating cows can increase milk fat, milk proteins and milk yields, so may well have a positive effect on calf growth rates too.

There is no one size fits all in terms of prevention, and there is a lot more research that needs to be done, but if you are suspicious of B1 in your calves then get in touch.

Repro Review

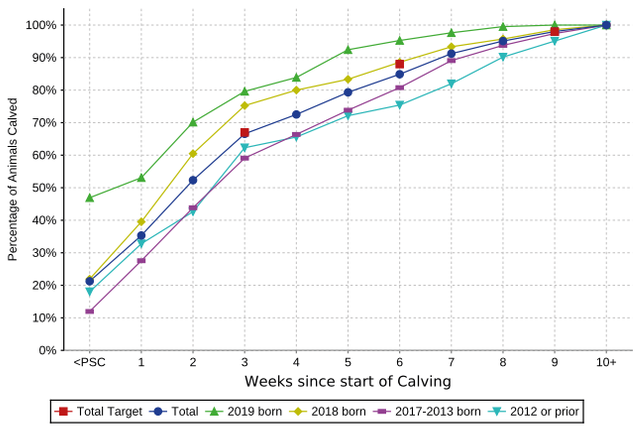
Amy Edwards BVMedSci BVM BVS



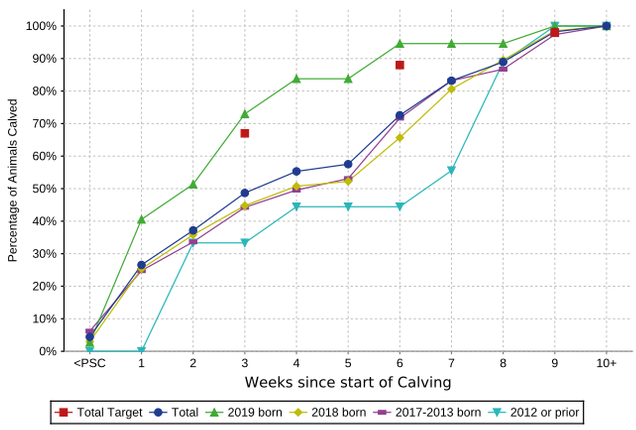
Part 1 Calving Pattern

Reproductive performance is a multifactorial puzzle. Using our early pregnancy scanning results we can start to assess slices of the pie to work out whether a farm's performance is on target to reach their goals and help to identify areas for improvement.

The calving pattern of a herd provides the foundation for this season's mating outcomes. Protracted calving periods mean fewer days in milk and less time to recover between calving and the planned start of mating (PSM). To have a good foundation for the following mating 67% of cows should calve in the first three weeks, with 88% calved by week 6.

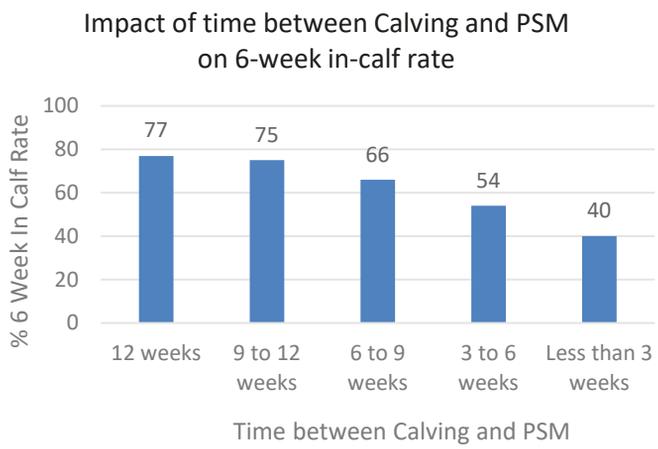


Farm A



Farm B

Assuming the start of calving is 12 weeks before the PSM, we can see that Farm A will benefit from a higher proportion of the herd calved by week 3; 67% vs 49%, and week 6. The subsequent impact of early calving on the achievable 6-week in-calf rate is dramatic.



This graph shows to achieve a 75% or more 6-week in-calf rate all cows need to have calved 9 to 12 weeks prior to the start of mating. Working backwards this would mean all your cows need to conceive in the first three weeks!

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Repro Review

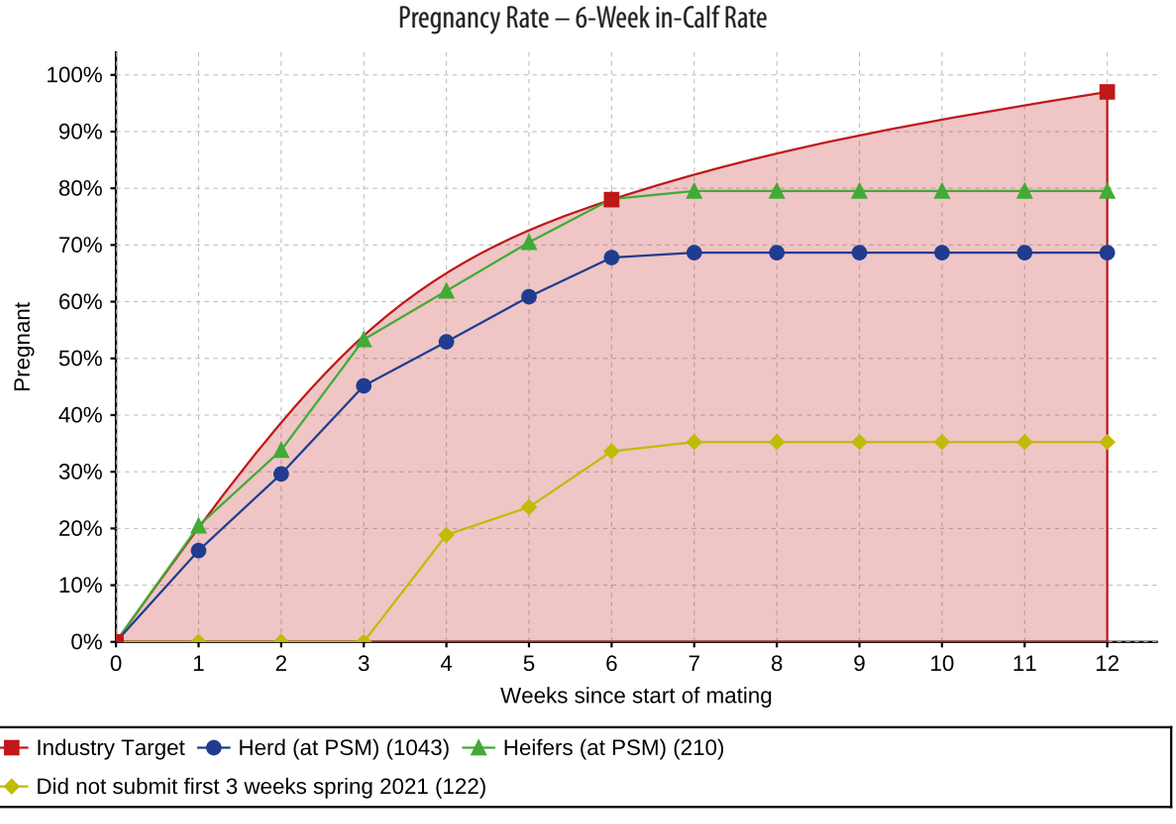
Amy Edwards BVMedSci BVM BVS

The cumulative effect of annual protracted calving patterns since the abolishment of inductions has made a 78% 6-week in-calf rate difficult to achieve. Likewise, genetic selection for milk production as the primary trait over reproduction has accelerated an industry-wide decline in pregnancy rate. High producing cows tread a fine line between feed utilisation and negative energy balance. Inadequate nutrition and body condition can cripple a cow's reproductive performance. Dramatic swings in 6-week in-calf rate also happen year to year if feed supply is limited or if a disease like BVD goes through an unvaccinated herd.

We must ask ourselves whether a 78% target for 6-week in-calf rate is helpful. We know that SMART goals are more motivational than a pie in the sky figure. Through data analysis we are able to recommend specific, measurable, achievable, realistic goals striven for in an appropriate time frame. Our local benchmarking, for example, shows the average 6-week in-calf rate so far this year is 67% with 73% the highest achieved last year.

InfoVet allows us to create customised groups to assess performance relative to the herd. For example, the pregnancy rate graph shows how heifers at Farm A (green) got in calf at a quicker rate than the herd (blue). We can conclude they were well managed through their transition into the milking herd and that they retained the advantage of their good calving pattern. Alternatively, the yellow line shows the pregnancy rate of cows not served during the first three weeks. These cows calved at least 35 days before PSM and received no intervention. The questions we sought to answer were; at what rate do they conceive? How much do they impact the herd 6-week in-calf rate? Is the equivalent cohort worth focussing time and money on next season? The answers; only 33% of these cows cycled and conceived between week 3 and 6 of mating, the 67% empty represent 8% of the herd and subsequently did impact the herd 6-week in-calf rate.

Three week submission goals need to remain high – the accepted target is 90% of the herd mated by day 21 after PSM. After all, according to our bar graph, farmers striving for the elusive 78% six-week in-calf rate need 100% of their cows served and pregnant in the first 3 weeks! Three week submission rate and conception rate are important drivers of 6-week in-calf rate. If we consider the possible reasons for the eligible cows failing to get pregnant in this window calving pattern is only one consideration. Anoestrus, issues with heat detection, poor heat expression, concurrent disease and body condition could all contribute. Detailed analysis helps us identify areas for improvement and help prioritise for the most economic gains. The next article in this series will dig into heat detection, our next slice of the pie.



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