



 CASE STUDY

# PILLARS PROGRAMME: A NEW DAIRY SYSTEM

## GENETICS

AbacusBio consultants worked with DairyNZ, and other research partners as part of the MBIE Pillars of sustainable dairy system research program, to assess how well the fertility breeding value could improve heard reproductive performance. The team was lead by Natalie Howes, following initial work of Edinburgh based consultant Hadyn Craig. Over three or more decades in the 2000s, there was a decline in cow fertility, resulting from negative genetic correlation between fertility and production. Meaning intensive selection for production traits eroded the fertility performance of cows over time.

Inclusion of fertility in the national breeding objective in 2001 resulted in an improvement in the genetic merit of fertility of NZ cows. Consultant Haydn Craig stated that however there was a long way to go before the industry were to reach its target for improved fertility. Therefore, it was opportune that a validation study of the fertility breeding value was undertaken and an analysis of how fertility genetic merit impacts herd performance across varying environments. This identified ways to target different selection strategies and increase the rate of improvement of fertility.

DairyNZ's genetic evaluation developer Melissa Stephen stated that, a cow's genetic merit for fertility does make a difference. This is in the sense that herds with fertility issues can benefit more from the selection of sires with higher fertility estimated breeding values (EBV) compared to the benefits that should be expected in high fertility herds

The magnitude of the impact of fertility EBV increases in proportion to the magnitude of the fertility problem. This provides an opportunity to use these differences in impact to make greater progress depending on how a farmer's herd is performing. An example would be through the creation of a specific index, such as low fertility herd breeding worth (BW), which farmers could use to place greater selection weighting to fertility.


This programme aimed to accelerate gains in genetic fertility in cow and enable a 5% improvement in the industry 6-week in-calf rate. AbacusBio built a herd fertility computer model, which uses complex interactions between physiology and genetics to simulate industry records.

The consultants used the herd fertility computer model to simulate various options and scenarios, and predict the effects of phenotypic improvements in the underlying physiology of fertility on the 6-week in-calf rate.

The programme used this modelling to understand how best to select or combine effective scenarios to achieve outcomes such as reproduction targets, and the economic impact of reaching these targets.

- The programme is an eight-year DairyNZ-led research programme that aims to provide management and genetic solutions to improve cow health, fertility and longevity.

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- Inefficiencies currently cost the sector more than \$1.5 billion per annum 

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- Through delivery of innovative solutions, IT WAS estimated \$550 million p.a. could be recovered

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- To identify new traits, the programme generated a unique herd of 550 heifers with high (+5%) and low (-5%) Fertility BV.