The Award Winning Langhill Herd

High and low genetic merit dairy cows split between two production systems

The Challenge

SRUC maintains a genetically unique dairy herd, offering a wealth of information dating back to its establishment in the 1970s. It provides researchers with a data and living resource to undertake controlled genetic, nutritional, fertility, productivity and environmental studies that are not possible on a commercial farm.

This herd is a highly valuable industry resource to test solutions for real challenges within the dairy sector; having two main aims –

1) Establish the biological, environmental and economic consequences of selection for milk production, including testing for unforeseen consequences of selection. This is achieved through comprehensive measurement of two genetic lines and estimating genetic correlations among traits of interest.

2) Develop new breeding goals (identifying the most appropriate combination of traits to select for and their relative economic importance) and developing genetic improvement tools to allow for this selection.

The Research

At any one time, the herd has approximately 200 adult cows, which remain in the herd for three lactations. Cows are then transferred to other groups within the research centre. This allows for efficiency within the financial resource available, whilst still monitoring longevity.

The Results

This work identified that selection for production has a major impact on body condition score, which in turn, affected reproductive performance. As a result, the UK was the first country in the world
to record body condition scores routinely and was the first to use this information in national genetic evaluations for dairy cow fertility.

The strength of this data combined with additional industry sources helped develop genetic and statistical methodology for predicting genetic merit in new breeding goal traits including longevity, fertility, body condition score, udder health and calving ease. This resulted in producing successive versions of a new selection index, the Profitable Lifetime Index (£PLI), which provides a single score to identify animals with the highest genetic merit for overall economic performance in breeding goal traits. This has been adopted across the UK.

The approaches and methodology employed have also influenced practice internationally via Interbull*.

Due to the nature of this herd and data generated, it has supported the assessment of global warming potential of four different dairy production systems through application of Life Cycle Assessment. Being within the same farm meant that results were directly comparable with each other. High genetic merit cows managed under a high concentrate feeding regime hold the potential to reduce emissions intensity by 24% compared to the average genetic merit cows managed under a low concentrate regime. Such analysis is highly valuable for policy makers and others shaping industry practice.

Equally, however, projects within this herd have also shown that narrow measures of environmental performance, e.g. greenhouse gas emissions or nitrogen balance, will not themselves distinguish dairy farming systems best fitted to future requirements that need to meet multiple food production, environmental and animal welfare criteria.

* Interbull is the agency running the international genetic evaluation programme, which oversees quality assurance and technical developments in cattle genetic evaluations.

The Future

The comprehensive database will allow SRUC to investigate new challenges as they arise, without the need to undertake new experimentation e.g. to better understand the response of livestock to current and future weather patterns and help farming to adapt to climate change.

This unique herd and dataset will continue to shape future advancements in £PLI, which has already supported significant improvement in performance and economic return in UK dairy farms. The herd will also continue to be a test bed for responses to the latest challenges and technological advances for the dairy industry.

Project Detail

Project start date: [1970s], finish date: [ongoing].

Email: Richard.Dewhurst@sruc.ac.uk, Head of Dairy Research & Innovation Centre, Professor of Ruminant Nutrition & Production Systems, SRUC.

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Further information: https://www.sruc.ac.uk/info/120195/dairy_research_centre

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Further Information

If you would like more information on dairy cow nutrition and management contact your local consultant or SAC Dairy Specialist at dairy@sac.co.uk