

# DRECA DAIRY RESEARCH SUMMARY

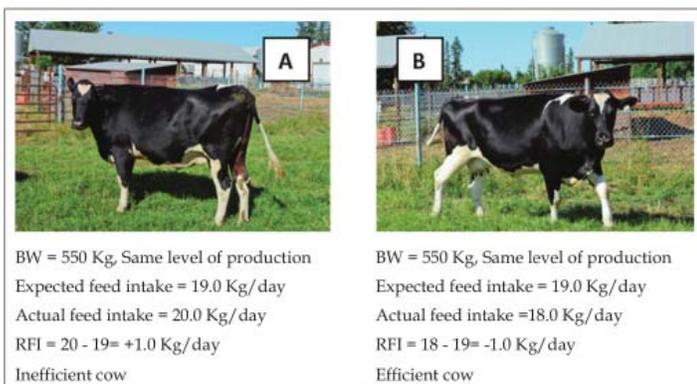
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## Residual Feed Intake Is a Profitable Trait for Selection

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### Why is this important?

Feed costs represent a large proportion of the variable costs in a dairy production operation and genetic improvement programs for production efficiency should include traits related to feed utilization. The limited use of feed efficiency measures from national dairy breeding objectives is mostly due to a lack of information on which to make selection decisions. Residual feed intake (RFI) is a liveweight and production-corrected measurement of feed utilization. It is recognized as a robust measurement of feed efficiency in livestock. Residual feed intake is defined as the difference between the actual feed intake and that predicted on the basis of mean requirements for body weight maintenance and level of production (*Figure 1*).



**Figure 1.** Concept of residual feed intake (RFI). Two animals which have the same BW and levels of milk production are expected to consume the same amount of feed, but in reality cow **A** consumes more than expected while cow **B** consumes less, so cow **B** is more efficient than **A**

Methods for evaluating RFI for meat producing animals during growth have been well studied in beef, swine and poultry. However, evaluating RFI for lactating dairy cows while accounting for multi-functional energy requirements (growth, pregnancy, and milk production) is complex. Therefore, to develop an equation to predict cows RFI while accounting for multi-functional energy requirements properly are the key to the success for improving feed efficiency through reducing the feed cost but maintaining the production level in the production system.

### What did we do?

We use daily individual feed intake, monthly energy (fat, protein and lactose) correct milk yield, monthly live body weight and body condition score of 293 lactating dairy cows with a total of 524 complete (287 first, 175 second and 69 third) lactation records to develop individual dairy cow RFI predict equation while accounting for the multi-functional energy requirements. The prediction equation has been published in Journal of Dairy Science in December 2013.

### What did we find?

Individual RFI for the 293 cows at the Dairy Research and Technology Center (DRTC) of the University of Alberta was evaluated using the developed prediction equation. The variations of individual RFI among the 293 cows were examined.

A sufficient RFI variation (Figure 2) was found among individual cows in the studied dairy population and the estimated heritability of RFI is about 0.20.

### What does this mean?

Since feed costs represent a large proportion of the variable costs in dairy production, reducing feed costs associated with milk production has major implications for improving profitability of the dairy industry.

Our results indicated that RFI is heritable, and a sufficient variation of RFI exists among individual dairy cows. Genetic improvement for feed efficiency for dairy can be achieved through selection for lower RFI in individuals to improve the dairy production system efficiency. Selection for lower RFI individuals in a herd should result in reduction of feed intake while maintaining level of milk production and weight gain. Obviously, this will lead to improving the production efficiency and profitability of the dairy operation.

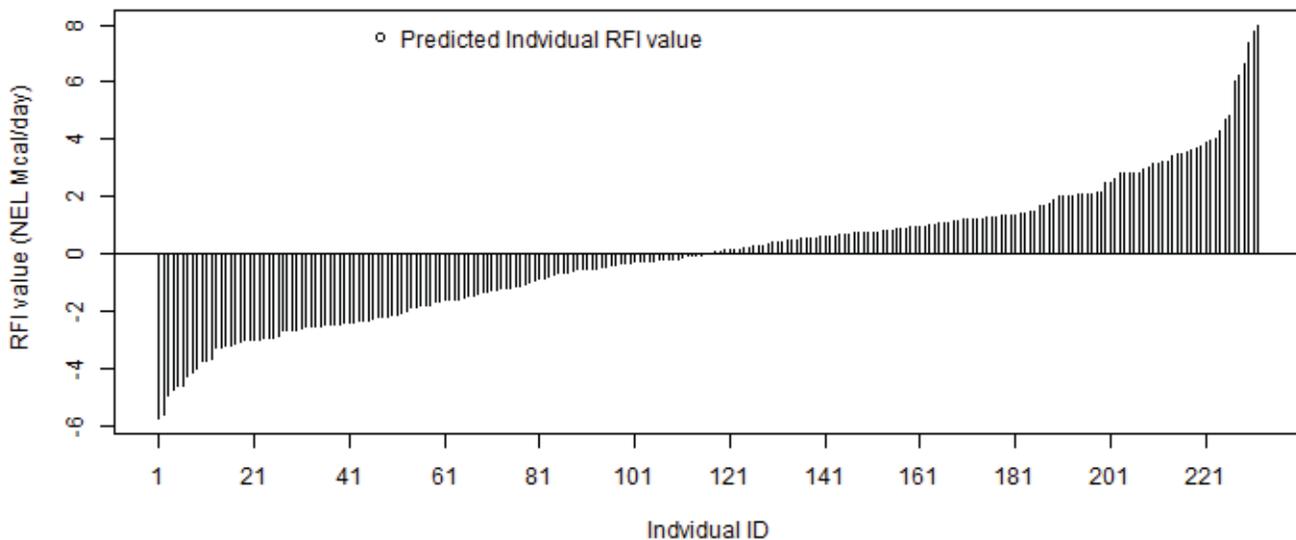


Figure 2. Variations of individual RFI of the dairy cows at DRTC; each bar indicates daily RFI (NEL Mcal /day) for each dairy RFI (NEL Mcal /day) for each dairy cow

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### Summary Points

- RFI for lactating dairy cows is predictable and needs to account for multi-energy requirements
- RFI is heritable with an estimated heritability of 0.20
- Variations of RFI exist among individual dairy cows
- Genetic improvement of dairy feed efficiency can be achievable through selection on RFI
- Improvement of dairy feed efficiency will lead to improvement of dairy production system efficiency and hence system profitability

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