

Feed Saved ABV

Technote 3

HIGHLIGHTS

- For no additional cost or effort farmers can breed a herd that utilizes feed more efficiently.
- Now, dairy farmers are able to identify bulls that can save at least 100kg of dry matter per cow per year while maintaining milk production at the same level.
- All of the new selection indices now include the Feed Saved ABV trait, so by choosing elite bulls farmers will be breeding for greater feed efficiency.

Farmers have been making gains in feed efficiency over the last 30 years through better nutrition and intense selection on milk production. Modern cows have become more feed efficient in the sense that their substantial increase in milk production has had the effect of diluting their maintenance requirements.

The Feed Saved ABV allows farmers to breed cows in a new way: by reducing the maintenance requirements of a cow for the same amount of milk produced.

This is a world-leading outcome for Australia. Our genetics researchers were among the first to devise a way in which measured feed efficiency can be used for a breeding value that incorporates real feed intake data as well as a prediction of feed required for maintenance purposes, thus making the trait more relevant.

The Feed Saved ABV

Dairy farmers can now identify bulls that can save at least 100kg of dry matter per cow per year while maintaining milk production at the same level.

In genotyped Holsteins, Feed Saved ABV utilises two components;

- Maintenance feed requirements predicted from type traits
- Residual Feed Intake which is the feed consumed by an animal above or below the predicted feed intake estimated by growth and production of the animal.

Feed Saved is the first of a new generation of traits that relies on genomics for its evaluation. Individual dry matter intake data is too expensive and impractical to collect on farm. However, the feed intakes from cows based in research centres in Australia (DEDJTR Ellinbank), Netherlands and the UK have been measured to establish a reference population. This data has been incorporated with a prediction of the feed required for maintenance

purposes. Genomics is then used to evaluate residual feed intake and in turn Feed Saved for all other genotyped Holsteins.

In other breeds, Feed Saved is calculated based on maintenance requirements predicted from type traits.

Expression of Feed Saved ABV

The Feed Saved ABV is expressed in kilograms (dry matter) of feed saved per cow per year. A positive number represents feed saved; a negative number represents extra feed consumed.

Example Feed Saved ABVs



Holstein		
BULL ID	BPI BALANCED PERFORMANCE INDEX	FEED SAVED FEED SAVED ABV
A	336	- 43
B	320	- 147
C	302	- 4
D	301	110
E	285	2
F	282	- 6
G	277	72
H	277	- 26
I	274	18
J	268	111

\$ profit/cow/year kg feed saved /cow/year

Figure 1 an example of Feed Saved ABVs.

Feed Saved ABV Statistics

Feed Saved is a moderately heritable trait (between 0.2 and 0.3) which means that selection for feed saved will make a difference.

There is a range in Feed Saved ABVs amongst bulls and cows. In August 2016, Feed Saved ABVs ranged from -261 to +237 kg. The standard deviation is 77 kg in Holstein bulls which means that most bulls (68%) will have Feed Saved ABVs +/- 77 kg.

At this stage, reliabilities for Feed Saved ABV are lower than production traits at around 35% but this will improve through adding 120 cows each year to the reference population and extending international collaborations.

Feed Saved over time

Figure 2 shows the genetic trend of Feed Saved in Australian cows. The graph shows that since 1990 there has been a negative trend for Feed Saved, with significant variation from year to year. To put this trend in context, the change in the trait over the 22 year time frame represented on this graph is about half a genetic standard deviation. This trend is typical of a trait where no evaluation or active selection has taken place.

It is expected that this trend will improve with the implementation of Feed Saved ABV and inclusion in breeding indices.

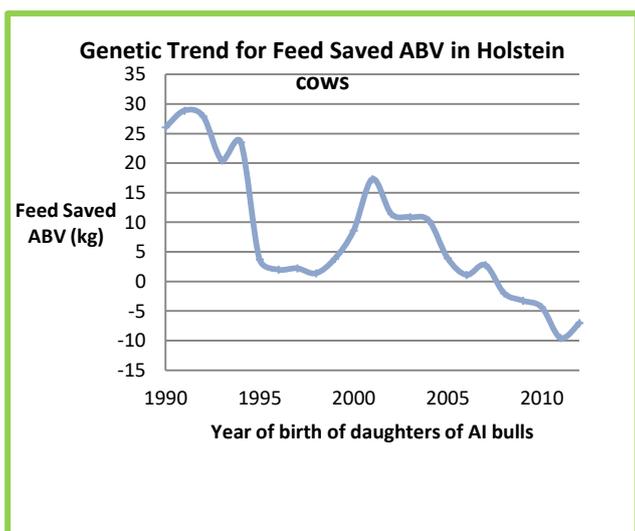


Figure 2: Genetic trend for Feed Saved ABV in Holstein cows

The value of Feed Saved

Any increase in feed efficiency is valuable for dairy farmers because feed represents about half of a typical dairy farm's variable costs.

As shown in Figure 1, some bulls can save at least 100 kg of dry matter per cow per year. While this might only equate to a quarter of a bale of hay, when multiplied over an entire herd and compounded year on year, the savings really add up. Remember, genetic gain is permanent and cumulative.

The best way of breeding for feed efficiency is to use one of Australia's breeding indices. Feed Saved ABV is included in all three breeding indices and replaces the liveweight trait formerly used in previous indices.

Feed Efficiency in other countries

In recent times, there has been a global move towards evaluating traits similar to feed saved or feed efficiency.

For example, in December 2014 Holstein USA updated the TPI formula to include Feed Efficiency. This approach presents an estimate of milk production minus the cost of feed used for maintenance, and so is very different to the Australian Feed Saved trait.

Bulls are commonly evaluated in more than one country. As the trait definition can differ widely between each country, there will be bulls deemed to be leaders in one country and not the other. It is important to remember that Australia has the most relevant breeding values for decisions made in Australia – both in terms of increasing the amount of feed saved and also selecting for feed efficiency in a way that focuses on Balanced Performance (BPI), Health (HWI) or Type (TWI).

Feeding and Breeding

Breeding for feed efficiency goes hand-in-hand with on-farm management and supports the work nutritionists are doing to improve feed efficiency.

A recent report, called **Feeding the Genes**, demonstrated that genetic improvement works for all feeding systems. In every feed system the cows with higher merit for production produced more milk and the cows with higher merit for survival lived longer. In fact, Feeding the Genes suggests the benefits of using ABVs are even more significant in more intensive feeding systems and at higher production levels.

Good feeding practice and the strategic selection of high genetic merit bulls is a profitable combination.

Summary

The Feed Saved ABV allows farmers to breed cows in a new way: by identifying the cows that eat less for the same amount of milk produced.

With every joining, farmers have the opportunity to make genetic gain. For no additional cost farmers can breed a herd that utilizes feed more efficiently. All it takes is making the right breeding decisions. Australia's new breeding indices make this a straight-forward task.

The Feed Saved ABV is a Dairy Futures CRC project, delivered with the support of the Commonwealth of Australia and Dairy Australia, and involving collaboration by Gardiner Foundation, the Department of Economic Development, Jobs, Transport & Resources, ADHIS and the University of Melbourne.

For more information

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Videos and factsheets are available at

<http://dairybio.com.au/animal-improvement/feed-saved/>

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