Cell count ABVs
Technote 8

HIGHLIGHTS

- While most variation in mastitis incidence is due to the management environment, long term gains are achievable by selecting bulls using Australian indices.
- A Cell Count ABV more than 100 means improved resistance to mastitis (reduced cell count) compared to the average.

Cell Count ABV

Mastitis lowers farm profitability, reducing both product quality and quantity. Dairyfarmers can select bulls that produce daughters that are less susceptible to mastitis using the Cell Count ABV. This leads to the selection of more profitable dairy cows.

While most reduction in mastitis comes from improved management, breeding for low susceptibility to mastitis can have considerable long-term benefits. Genetic variation for Cell Count does exist and some bulls have been found to produce daughters that are less susceptible to mastitis than others.

Mastitis has an impact on farm profit. Therefore Cell Count ABVs are included in the Balanced Performance Index (BPI), Health Weighted Index (HWI) and Type Weighted Index (TWI). Farmers will improve mastitis resistance by selecting bulls using any of the three indices.

Cell Count ABV Expression

Cell Count is expressed as a percentage more or less than the average of 100. To improve mastitis resistance, select bulls with a Cell Count ABV more than 100.

ADHIS analysed the national milking population to determine the group of cows which represents the average of the current milking population. The average was determined as cows of the same breed that are 6 years +/- 2 years of age.

The average of this group is set at 0 for production traits and 100 for management traits, such as Cell Count and provides a reference point for comparisons between ABVs for both cows and bulls, as illustrated in Figure 1.

The average is updated each year so that it stays current and is a reflection of the cows that are milking around Australia, today.
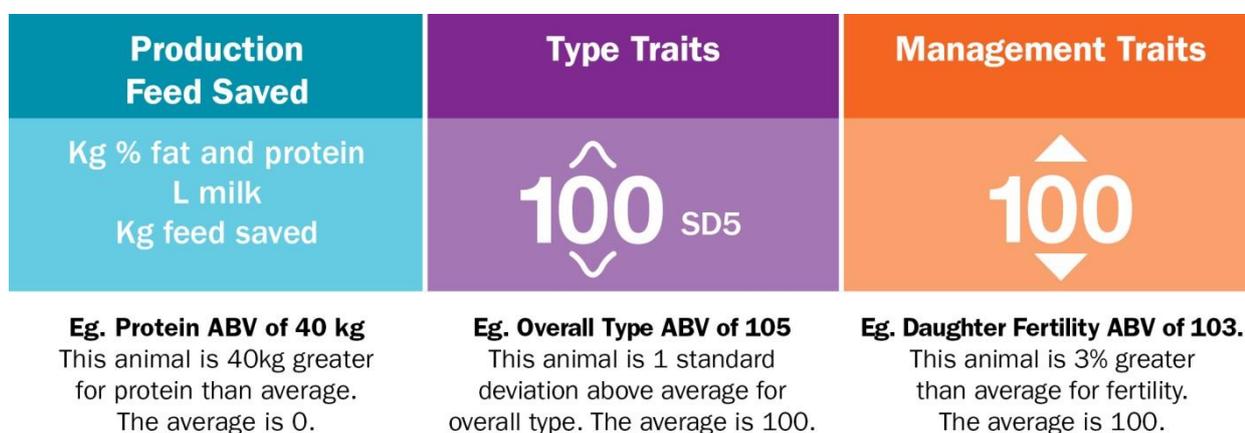

Production Feed Saved	Type Traits	Management Traits
Kg % fat and protein L milk Kg feed saved	100 SD5	100
Eg. Protein ABV of 40 kg This animal is 40kg greater for protein than average. The average is 0.	**Eg. Overall Type ABV of 105** This animal is 1 standard deviation above average for overall type. The average is 100.	**Eg. Daughter Fertility ABV of 103.** This animal is 3% greater than average for fertility. The average is 100.

Figure: 1 A summary of the expression of ABV traits

Higher Cell Count ABVs are an indicator of greater mastitis resistance. While lower Cell Count ABVs are an indicator of less mastitis resistance. Therefore:

- A bull with a higher Cell Count ABV will increase mastitis resistance (reduce cell count) compared to average
- A bull with a lower Cell Count ABV will reduce mastitis resistance (increase cell count) compared to average

Benefit of breeding for Cell Count

Mastitis has an impact on the farm profit. Therefore Cell Count ABVs are included in the Balanced Performance Index (BPI), Health Weighted Index (HWI) and Type Weighted Index (TWI). Every 1% change in Cell Count is estimated to be worth $1.07 net profit per cow per year. The difference between the best bull (CC ABV of 170) and worst bull (CC ABV of 20) is estimated to be $160 net profit per cow per year. For most bulls (66%) Cell Count ABVs range between 78 and 122.

The benefit each dairyfarmer gets from selecting for lower cell count relates to their herd's cell count average. The higher the herd's bulk milk cell count the higher the potential benefit. Herds with a very low bulk milk cell count will see less benefit. Given that most of the variation in herd mastitis levels is explained by non-genetic factors it is critical that dairy farmers continue to manage mastitis.

Heritability

An estimated 8% of the variation in cell count in the Australian dairy cow population is explained by genetics. The other 92% of variation is explained by the management environment of the cow.

The heritability of Cell Count is lower when compared to other traits such as protein kg (0.27) and milking speed (.15). However, at 0.08, there is still enough genetic variation to warrant genetic selection.

How is Cell Count ABV calculated?

From about the middle 1990's all test-day records were accompanied by a Cell Count therefore DataGene has a large data source for Cell Count analysis.

In 2008, scientists refined the techniques used to calculate Cell Count ABVs from herd recording data.

A somatic cell score is produced for each bull using test-day information from daughters. Each test day is treated as a separate measurement which is a better reflection of what really happens than a whole lactation average. The new technique allows scientists to model the trends in cell count through the lactation as well as the variations from the

'norm' which occur. The result is an improvement in the reliability of Cell Count ABV's and a greater number of bulls with publishable Cell Count ABV's.

Conclusion

The management environment is the predominant influencer of mastitis in a herd so genetics isn't a 'silver bullet' to solving a mastitis problem. However, for little or no cost, a dairyfarmer can make a long-term difference to the mastitis resistance of the herd by selecting high BPI, HWI or TWI bulls with Cell Count ABV more than 100 from the Good Bulls Guide.

For more information

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