

Key messages

- › The Cell Count ABV can be an indicator of mastitis resistance.
- › Mastitis has an impact on farm profit. Therefore Cell Count ABVs are included in the Australian Profit Ranking (APR).
- › A Cell Count ABV more than 100 means improved resistance to mastitis (reduced cell count) compared to the average.
- › Most variation in herd mastitis levels is due to the management environment not genetics.

Cell Count ABV

Mastitis lowers farm profitability, reduces 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.

Cell Count ABV Expression

To simplify bull selection, ADHIS has improved the expression of ABV's. 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.

Average represents the modern dairy cow. ADHIS analyses the national milking population to determine the group of cows that represent the average of the current milking population. This is set at 100 for non-production traits, such as Cell Count.

Profit Indexes	Production Traits	Non-Production Traits
\$ Profit more or less than average.	kg, % or L more or less than average.	% more or less than average.
\$	kg % L	100
Eg. APR of 120 This bull is \$120 more profitable than average. The average is 0.	Eg. Protein ABV of 40 This bull is 40 kg more protein than average. The average is 0.	Eg. Cell Count ABV of 104 This bull is 4% greater for mastitis resistance than average. The average is 100.

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 Australian Profit Ranking (APR). Every 1% change in Cell Count is estimated to be worth \$0.34 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 \$51 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 11% of the variation in cell count in the Australian dairy cow population is explained by genetics. The other 89% 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 percentage (40%), protein kg (25%) and milking speed (20%). However, at 11%, 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 ADHIS has a large data source for Cell Count analysis. ADHIS will officially publish Cell Count ABVs for individual bulls when their reliability reaches 50% with daughters in at least 15 Australian herds (Holstein and Jersey) or 30% with daughters in 5 herds (other breeds). If the bull has very few or no daughters in Australia, a Cell Count ABV(i) is published using Interbull data.

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 APR bulls with Cell Count ABV more than 100.