

# Survival ABV and Residual Survival ABV

## Technote 4

### HIGHLIGHTS

- Genetic selection for survival (longevity) will increase profitability.
- Survival is a complex trait with many factors influencing the length of a cow's herd life.
- The Survival ABV includes all the non-production factors that influence a cow's herd life.
- The Residual Survival ABV is Survival ABV adjusted for traits known to influence a cow's herd life.
- Residual Survival ABV is included in all indices.

### Survival's contribution to profit

The two most important determinants of a dairy bull's genetic merit for profitability are milk production and survival. Survival – also known as longevity or productive herd life – refers to a bull's ability to produce daughters that last in the herd for many lactations.

Survival is a significant contributor to overall profitability on dairy farms in Australia. By improving longevity:

- fewer replacements are needed, which means lower heifer rearing costs (or greater income as surplus heifers are sold);
- the herd is more mature – more mature cows produce more milk than younger cows; and
- a greater proportion of the culling decisions can be based on production, resulting in an increase in the average production of the herd.

### Influence of other traits on Survival

Research from the Victorian Department of Economic Development, Jobs, Transport and Resources studied relationships between various traits and survival (Haile-Mariam and Goddard 2009). The relationships were examined again in 2014 as part of the National Breeding Review. In both studies, the traits that explained variation in survival were consistent. In summary, the researchers found that the main traits affecting the survival of cows from lactation to lactation are production index, fertility, disease resistance, overall type and likeability. As a cow ages, other traits, such as udder depth and pin set, become more important.

### Survival ABV and Residual Survival ABV

In Australia, there are two ABVs relating to survival.

**Survival ABV** represents the proportion of daughters that last from one lactation to the next.

**Residual Survival ABV** is the component of survival not related to production, fertility, cell count, workability and type traits.

### Survival ABV

The Survival ABV is a holistic breeding value used to select for longer lasting cows. It is similar to traits like productive herd life, used in other countries.

### Estimating survival

Actual survival records are the best way to analyse survival. However until enough survival data are collected predictor traits are used. The use of some form of predictors has been adopted in most countries. These traits are not perfectly related to survival but give an early estimate. The type and workability predictors of the best estimate of survival at an early age are:

- Likability
- Overall Type
- Udder Depth
- Pin Set

DataGene uses the above ABVs and genomic information to predict Survival ABV in young bulls. The accuracy of the Survival ABV increases as more survival data are added. The Survival ABV of older bulls with many daughters is derived mainly from actual survival data.

### Using the Survival ABV

Survival ABV is expressed as a percentage more or less than the average, which is 100 as illustrated in Figure 1 (over the page).

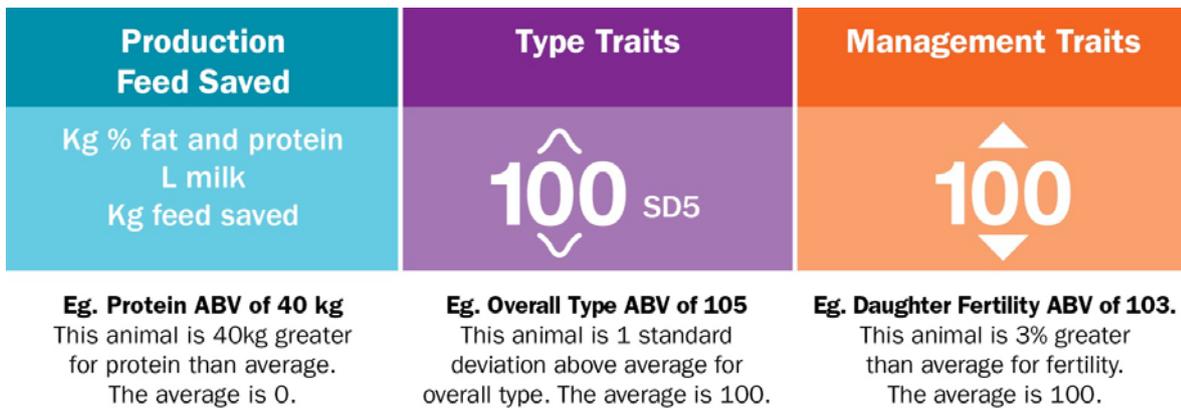


Figure 1: Expression of ABVs

There is a difference of about 20% more daughters lasting from one lactation to the next between the highest and lowest bulls for Survival ABV. For example, in the Holstein breed, the highest bull has a Survival ABV of 111, compared to the lowest bull at 91.

The easiest way to breed cows that survive and thrive in the herd is to select bulls from the Good Bulls Guide using one of Australia's three indices. To apply even more selection pressure, you can check that bulls in your team have a Survival ABV of more than 100.

### Residual Survival ABV

Australia's breeding indices include the main traits that influence survival. But even after these traits are accounted for, some cows still last longer in the herd. Figure 2 illustrates the variation in Survival ABV that can be explained using traits in the indices. Fifty-four percent of the variation is described as 'Residual Survival' in Holsteins and 57% in Jerseys.

Lameness, maternal calving ease, metabolic disorders and susceptibility to disease are amongst some of the factors which may contribute to these cows lasting longer. The Residual Survival ABV aims to estimate the benefit of factors for which we do not currently have an ABV.

Residual Survival ABV is the difference between actual survival and predicted survival.

Residual Survival ABV is used in Australia's selection indices as a contributor to overall profit. Residual Survival ABV is used instead of Survival ABV to avoid double counting traits like production, fertility and type traits. Double counting traits would mean some traits would be over-emphasised causing bulls or cows to be unfairly evaluated.

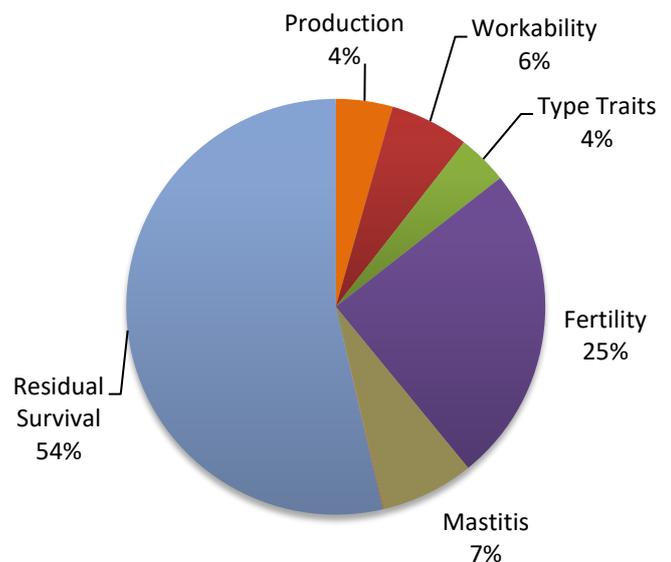


Figure 2: Variation explained in Survival ABV (Pryce & Nieuwhof, 2014).

### For more information

Haile-Mariam, M. and Goddard M.E. (2009) AAABG Criteria for selecting and predicting herd life in dairy cattle

Pryce, J. and Nieuwhof, G. (2014) Residual Survival and the NBO, an industry presentation Dec 2014

### For more information

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December 2016