



Movements in Jersey rankings

April 2019 ABV release

April 2019 is the first public ABV release with Residual Survival removed from Australia’s three dairy breeding indices: BPI, Health Weighted Index (HWI) and Type Weighted Index (TWI).

April 2019 is also DataGene’s first public ABV release to be done with a new genetic evaluation system. Extensive testing shows the new system is as good as, or better than, the old system at predicting future performance across traits.

However, this ABV release has seen some animals move for Balanced Performance Index (BPI). For example, the top proven and genomic Jersey bulls (David and PUBLICAN) have dropped 359 to 265 and 320 to 273 respectively but stand as the #1 Proven and #2 Genomic BPI bull in the breed.

DataGene has explored the largest movements and is comfortable they are consistent with model and data changes.

The movements are primarily the result of the removal of residual survival from the Balanced Performance Index, and refinements to the Fertility ABV.

Note: The three breeding indices – BPI, HWI and TWI – are not comparable across breeds. A BPI of say 200 in a Holstein is not comparable to a Jersey with a BPI of 200, as the measures are relative to their breed average. An example of bull movement

David has sat as the #1 proven bull in the breed for some time now – and he remains so in this run. However, his BPI is not the same as before.

BPI – December 2018	359
ASI moved from 194 to 181	-13
Fertility moved from 100 to 98	-14
O Type moved from 112 to 107	-10
Mammary moved 114 to 109	-10
Remove Residual Survival	-35
Small movements in other traits	<u>-12</u>
BPI – April 2019	265

At 265, David was – and still is – a Good Bulls Guide bull at the top of the Proven list.

Some other examples are:

CRDIVIDEND – 291 to 185 – of which 88 points are related to Residual Survival and 21 related to Daughter Fertility.

Valentino – 266 to 175 – of which 45 points are related to Residual Survival, 18 are related to ASI (Production), 28 on Fertility and a bit on type.

Survival and residual survival

Australia’s three breeding indices account for the key traits which influence a cow’s survival in the herd: production, fertility, cell count, type and workability. Survival is also influenced by other traits that we don’t measure such as lameness, metabolic disorders, maternal calving ease and susceptibility to disease. Residual Survival aimed to capture the economic value of these additional traits that influence survival, while avoiding double counting those traits already included in the indices.

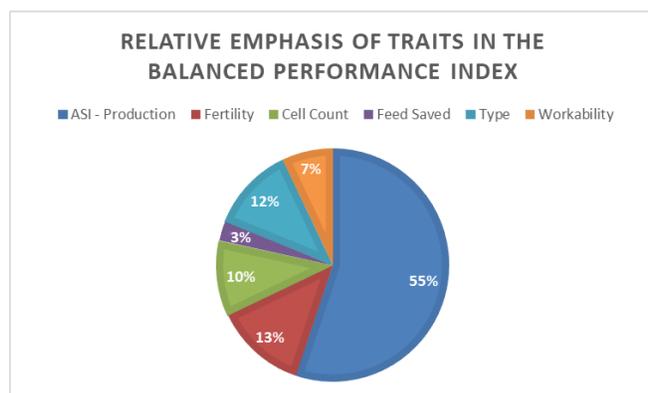
Residual Survival has been included in Australian indices since 2015. However, in practice, implementation has been challenging and it has been unstable from run to run (when information from different sources is added).

The Genetic Evaluation Standing Committee made the decision to remove residual survival from the three indices from April 2019. This group includes representatives of the herd improvement industry, farmers and technical and science advisors. Its role is to advise DataGene on policy decisions related to genetic evaluation.



The indices still account for the main determinants of a cow's survival in a herd: production, fertility, cell count, functional type and workability.

Without residual survival, the relative contribution of the remaining traits (including fertility) increases, as shown in the following pie chart.



Fertility ABV

The Fertility ABV has been refined and now includes data from all lactations (previously limited to 5). This means that we are now using an average of 4.5 lactations in the new calculations where in the past the average number of lactations of cows with Fertility Breeding Values was 3.5. The addition of more data improves our ability to predict performance.

Fertility is a significant contributor to the BPI, so some animals have moved due to changes in their Fertility ABV. A bull moving from 105 to 100 for Daughter Fertility would lose about 35 BPI.

Why Jerseys?

The removal of residual survival has had more impact on Jersey animal BPIs than Holsteins and Red Breeds.

There are strong family relationships within the Jersey population. A significant change in the BPI of a major bull can have a domino effect on his many relatives in the Australian Jersey population.

Investigating BPI movements

DataGene has investigated animal movements and is comfortable with their current BPIs and breeding values.

These investigations included looking at correlations between the December 2018 and April 2019 ABV run. Correlations help us understand how close the data is between two time periods. If it was the same data, the correlation would be 1. Correlations between December 2018 and April 2019 are

consistent with the improvements implemented. For example, the correlation in production traits is between 0.97 and 0.99. However, the correlation of BPI is lower (0.91 to 0.95) due to changes to Residual Survival and the improved Fertility ABV model.

The amount of movement in animals between December 2018 and April 2019 varies between traits. For example, in production breeding values (ASI), Jersey proven bulls have an average movement of -2.3 with the difference in ASI for most bulls (66%) being +/- 11. The movement in BPI is much greater mainly to residual survival and daughter fertility. The difference in BPI for most bulls (66%) is within +/- 47 with an average movement of -9.0 BPI. However, most of the top bulls in December remain top bulls in April.

Correlation between December 2018 and April 2019 in Australian Breeding Values (Jerseys)

	Proven bulls	Genomic bulls	Genomic cows
Production (ASI)	0.99	0.98	0.97
Fertility	0.88	0.82	0.82
Survival (Longevity)	0.99	0.98	0.96
Overall Type	0.97	0.95	0.93
BPI	0.95	0.95	0.91

Cow and herd movements

In females, the correlations between December 2018 and April 2019 are strong and most females in the Jersey population have not moved significantly. The average movement in Jersey genomically tested cows is +8 with most animals (66%) moving with a range of +/-42. However, some of the top females in the country have moved noticeably.

Some of the animals that have extreme movements have a Direct Genomic Value (derived from her genomic analysis) that is far higher or lower than her breeding value derived from on-farm performance information. In these cases, there are two estimates of genetic merit from two different sources that don't line up. The method of blending the Direct Genomic Value and traditional ABVs is subtly different which makes little difference in most animals but has a noticeable impact on these extreme animals.

Despite individual movements in top animals, there is little change to the top 10 Jersey herds in Australia.

Testing the new system

DataGene has spent months testing the new system to ensure the breeding values predict the performance of animals as accurately as possible. A range of tests were performed, including passing Interbull tests for validation. Another key test was forward prediction, where a bull without daughters in 2012 was evaluated and then re-evaluated 5 years later with milking daughters in the national herd. The key results from this analysis are shown in the table below.

Across all traits, there is an average 11% increase in the correlation between proofs before and after adding daughters in Jersey bulls. The traits that showed the biggest improvements were Fertility and Survival.

Forward prediction: traditional ABVs

	Average correlation improvement (predicted to actual)	Average reduction in bias	Biggest improvements
Holstein	↑ 8%	0.04	Fertility and Overall Type
Jersey	↑ 11%	0.00	Fertility and Survival
Aussie Reds	↑ 7%	0.10	Fertility and Likeability

Easier access to information

DataVat is a web portal that provides access to a range of tools and reports that draw upon a massive industry database, including the genetic evaluation system.

Over the coming months, DataVat will become available to the Australian dairy industry. Once formally launched, it will be easy to look up top ranking females as well herds and bulls.

Further reading

[Tech Note 4 \(Survival and Australian Breeding Values\)](#)

More information

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