

Red breeds base

Technote 30

HIGHLIGHTS

- From December 2022, Australian Breeding Values (ABVs) and indices (BPI, HWI, SI) for red breeds (Aussie Red, Illawarra and Ayrshires) are reported on separate bases. These values are now breed-specific and not comparable across breeds.
- This is consistent with DataGene's policy for all other breeds.
- 113 historic Scandinavian Red bulls that were wrongly identified as Ayrshires are now correctly classified as Aussie Red on DataGene's genetic evaluation system (based on genetic analysis).

Base value (average)

Indices and Australian Breeding Values (ABVs) are relative measures, meaning they make more sense when compared to each other or to an average. The average, also known as the base is a clearly defined group of animals to which all others are compared.

In Australia, the base is defined as the purebred cows of the same breed that were born between 2009 and 2013. It is updated periodically so it reflects the cows that are milking in today's herds.

This is why ABVs and index values are breed specific, meaning the values are not comparable between breeds. For example, the BPIs of Holstein animals are not comparable with BPIs of Jerseys.

The base is set a zero for production traits, feed saved, gestation length and indices (BPI, HWI, SI and ASI).

The base is set at 100 for type, health and management traits.

Red breeds base

Historically, the ABVs and index values of all red breeds (Aussie Red, Illawarra, Ayrshire and Dairy Shorthorn) were calculated on the same base.

In response to industry requests, red breeds have been split onto separate, breed-specific bases from December 2022.

Prior to this, the BPI of say an Aussie Red was comparable with BPIs of animals in other red breeds. This is no longer the case.

Implementation of separate red breed bases

Comparing each red breed only to itself rather than all red breeds has changed the ABVs for all traits and all indices. The genetic merit of individual animals has not changed since the underlying calculations have not changed; only the population to which each animal is compared has changed.

Each breed has its own "zero point" for BPI (and all other traits), based on the breed average. Each breed has its own range for traits based on the inherent variation within the breed. Breeding values are no longer comparable between the four red breeds as they are compared to different populations.

For instance, changing to an Ayrshire base increased the BPI for Ayrshire animals by \$76 compared to an all-reds base. This does not mean that the animal will deliver an extra \$76 over the breeding values released on the old all breeds base. It means simply that when Ayrshires are compared only to other Ayrshires, the resulting BPI is different.

The table below shows the approximate base changes for the four red breeds and a cross section of traits.

Table 1: Base changes in red breeds for some traits.

	BPI	HWI	ASI	Overall Type	Mamm	Fert
Ayrshire	76	85	57	-1	-1	4
Dairy Shorthorn	69	-20	107	-3	-1	-7
Illawarra	77	92	33	-3	-1	4
Aussie Red	-35	-43	-32	1	1	-2

Reliability

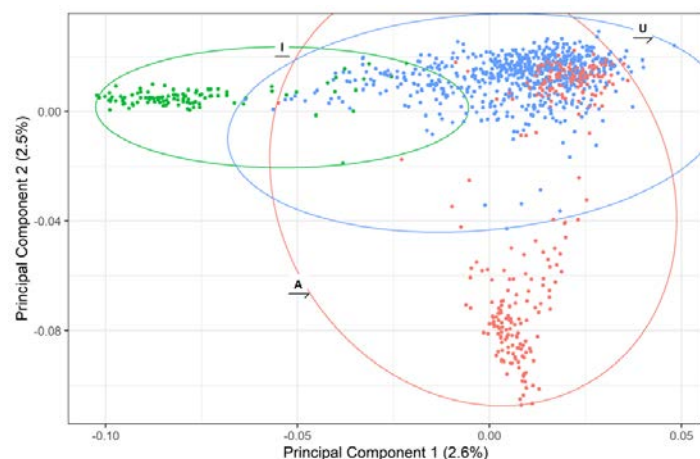
Reliability is not affected by splitting the red breeds base.

Breed identification

A 'principal component analysis' (PCA) was undertaken using genotypes to better understand the degree of relatedness between the three key Red Breeds (Ayrshire, Illawarra and Aussie Red). Based on these first two principal components, three distinct groups of bulls were observed, corresponding to Aussie Red, Ayrshire, and Illawarra sires.

Figure 1 shows the results of the PCA analysis.

Figure 1: Principal Component Analysis (PCA) Results



Each dot on the graph represents a bull. The green group designated "I" represent Illawarra bulls. The pink group designated "A" represent Ayrshire bulls and the blue group designated "U" represent Aussie Red bulls.

This analysis also identified 113 historic Scandinavian Red bulls that were mistakenly

identified as Ayrshires but were clearly genetically closer to Aussie Red. These bulls are the pink dots that can be seen amongst the blue dots. These are now classified as Aussie Red on DataGene's genetic evaluation system.

Acknowledgement

DataGene is an initiative of Dairy Australia and the herd improvement industry. DairyBio provides the research pipeline to develop and maintain Australian Breeding Values.

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