

A multi-country Single-Step BREEDPLAN Analysis released for the Limousin breed across the Southern Hemisphere

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The BREEDPLAN team at the Agricultural Business Research Institute (ABRI) is pleased to announce the release of a multi-country Single-Step BREEDPLAN analysis for the Limousin breed across the Southern Hemisphere, released as the November 2023 Southern Limousin BREEDPLAN analysis.

The Southern Limousin BREEDPLAN analysis combines data from three participating breed societies:

1. The Australian Limousin Breeders' Society.
2. The Limousin Cattle Breeders Society of Namibia.
3. The Limousin Cattle Breeders Society of South Africa.

Members of the participating breed societies, located across at least seven countries (including Australia, Botswana, Namibia, New Zealand, South Africa, Zambia and Zimbabwe), now have access to an analysis that includes genomic (DNA) information in the calculation of BREEDPLAN EBVs. This achievement has been made possible through collaboration between the three Limousin breed societies and staff at the Animal Genetics and Breeding Unit (AGBU) and ABRI.

What is Single-Step BREEDPLAN?

Single-Step BREEDPLAN uses analytical software developed by AGBU, a joint venture of NSW Department of Primary Industries (NSW DPI) and the University of New England (UNE), funded by Meat and Livestock Australia Limited (MLA). The Single-Step BREEDPLAN evaluation utilises pedigree, performance and genomic information simultaneously. The evaluation takes account of each animal's actual genetic relationship with all other genotyped animals, including those in the reference population. The reference population is the set of Limousin animals that have genotypes (SNP data) and phenotypes (performance records) for each particular trait.

SNP data is now being used along with pedigree and performance data to calculate BREEDPLAN EBVs and accuracy "in one step". This applies to all traits in a multi-trait model combining birth, growth, fertility and carcase traits. As such, SNP data provides additional information in these calculations by accounting for the true genomic relationships among animals and how the SNP information relates to the performance records for each trait in the analysis. An important feature of the Single-Step BREEDPLAN approach is that complete use is made of the high density of genotypes recorded by members of participating Limousin breed societies.

What are the advantages of Single-Step BREEDPLAN?

There are advantages that come with genomics and the Single-Step BREEDPLAN model. When young animals are genotyped at an early stage in life, they can achieve higher levels of EBV accuracy earlier in life – especially for traits expressed later in life – than is possible with a conventional (non-genomics) BREEDPLAN model. This equates to greater accuracy of selection decisions, at an earlier stage in the growth of animals, for Limousin breeders in the Southern Hemisphere. Furthermore, for breeders with small herds, accuracy levels are often limited by small contemporary group sizes even when pedigree and performance records are available. If calves are genotyped, however, they can accumulate additional information – and accuracy – via their relationship to the wider genotyped and performance recorded population.

Ultimately, implementation of Single-Step BREEDPLAN for the Limousin breed provides members of the Australian Limousin Breeders' Society, the Limousin Cattle Breeders Society of Namibia and the

Limousin Cattle Breeders Society of South Africa with greater returns on their investment in the genotyping of seedstock cattle.