A Leap Forward in Genomic Enhanced BREEDPLAN EBVs

In a first for the Australian beef industry, the BREEDPLAN analysis is now able to incorporate genomic (i.e. DNA) information for multiple traits developed from a large 50K SNP panel. This was introduced in the April 2011 Angus GROUP BREEDPLAN analysis and was based on Molecular Value Predictions (MVPs) from the Pfizer Animal Genetics (PAG) Angus 50K product.

This follows the successful incorporation of genomic data into the Brahman BREEDPLAN analysis in October 2008 for the Shear Force EBV (i.e. tenderness). In contrast, this was for a single trait and from a small 56 SNP panel where 4 of the SNP’s had some known effect on the Shear Force trait.

The Pfizer Animal Genetics (PAG) Angus 50K product assesses the genetic makeup of Black Angus cattle at more than 50,000 locations across their whole genome. These locations are known as DNA markers or more specifically as SNPs (pronounced ‘snips’) which are single nucleotide polymorphisms. In order to do this, PAG have undertaken “discovery” research in Angus cattle populations to determine the magnitude of the effects of each of the 50,000 SNPs on 13 traits analysed. Then for each animal, these effects are reported as measures of genetic merit, branded as Molecular Value Predictions, or MVPs.

Research conducted by scientists at the Animal Genetics and Breeding Unit (AGBU), with assistance from Meat and Livestock Australia (MLA), PAG and the Angus Society of Australia, has enabled MVPs for 7 of the 13 traits to be incorporated into the monthly Angus BREEDPLAN analysis, potentially increasing the accuracy of EBVs for those animals with MVP data available.

The 7 MVP traits that are being incorporated into the Angus BREEDPLAN analysis include birth weight, weaning weight, milk, carcase weight, carcase rib fat, carcase eye muscle area and carcase marbling. Angus animals with MVP data included will be identified with a trait indicator on the Angus Australia animal search facility as the PAG Angus 50k logo.

“This is an important breakthrough for industry – now all 3 sources of possible information on an animal, pedigree, its own performance and that of its recorded relatives, and its own DNA test, can be combined into a single EBV. Industry has sought this outcome, and it will help avoid confusion for breeders and producers through information overload”, said Peter Parnell, CEO of Angus Australia. Only the MVPs of those animals that are submitted to Angus Australia for HD50K testing with Pfizer Animal Genetics will be used in the routine Angus BREEDPLAN analysis.

This integration of Pfizer MVPs into BREEDPLAN EBVs depends on the calibration work that has been conducted by AGBU scientists. “Calibration means establishing the accuracy of the DNA test in relevant Australian cattle populations, and is vital in allowing breeders to make best decisions about how to use the new DNA tests”, said David Johnston, Principal Research Scientist at the Animal Genetics and Breeding Unit (AGBU). The full calibration results and explanation of the analytical components are available on the AGBU website (http://agbu.une.edu.au).

The current method used to incorporate the MVP data into the BREEDPLAN analysis is known as “blending”. This means BREEDPLAN EBVs are generated for all animals as normal using all known pedigree and performance data. After which, those animals with MVP data have it blended into their 7 related BREEDPLAN EBVs.

“Blending of MVPs into BREEDPLAN EBVs is a major step forward towards routine industry use of DNA testing, and would not have been possible without the cooperation between Angus Australia, Pfizer Animal Genetics, AGBU and the BREEDPLAN team at ABRI”, said Dr Rob Banks, MLA Manager of Genetics R&D.
“This will help breeders assess the technology for their own use, confident that it will fit into the BREEDPLAN framework, which is fundamental to accurate, effective genetic evaluation, and hence to the genetic improvement which is vital for our industry”, Dr Banks said.

While the incorporation of genomic information into the BREEDPLAN analysis is an exciting enhancement, particularly for increasing the EBV accuracy of “young” animals, it will be of most value when calibrated genomic information is available on economically important yet hard to measure traits such as feed efficiency and fertility.

Should you have any queries regarding the incorporation of the results from the Pfizer Angus 50K product into the Angus BREEDPLAN analysis, please contact staff at BREEDPLAN.