

Understanding Genomics Fact Sheet

*Updated April 2023



WHAT IS GENOMICS?

Genome: The genetic material of an organism.

Genomics: The study of the genome.

Genotype: The genetic makeup of an animal.

SNP: Single Nucleotide Polymorphism referred to as SNP's (pronounced SNIPS) are DNA markers.

DNA is extracted from the sample provided, and the DNA is run on a SNP panel. Herefords Australia utilise two different kinds of SNP panels:

- GGPLD (Low-density genotype) – Approximately 100,000 SNP DNA markers.
- ULD (Ultra Low-density genotype) – Approximately 30,000 SNP DNA markers.

The genotypes listed above are classed as genomic tests and used to obtain the genetic makeup of an animal. Within the total number of SNP markers looked at, we can extract certain sections that look at specific traits and genetic conditions. The information then allows us to calculate an animal's genetic merit due to the large number of SNP markers available.

There are two Ultra-Low Density options available:

1. The GGPULD (for females only) gives members the opportunity to genotype their cow herd with a more cost-effective genotype option. Once completed, these animals will have genomically enhanced EBVs. This test is only available using TSU samples.
2. The PVULD is used for Parent verification to confirm the sire and/or dam of an animal. This test can be upgraded (for females only) to a GGPULD for a cost of \$10 per animal.

Microsatellite, also referred to as a MIP, was the first type of DNA testing Herefords Australia introduced. From early 2016, MIP testing was phased out to make way for the far more accurate SNP testing. MIP tests only analyse a very small number of markers (approximately 21) and are run on a different testing platform. Due to this, an animal on a MIP profile cannot be compared to an animal on a SNP profile for parent verification. It is strongly encouraged that any active animal on a MIP profile be upgraded to a SNP profile for any future parent verifications, or a genomic test to examine genetic conditions or specific traits. MIP testing will cease to be available at the end of 2020.



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WHAT WILL GENOMICS TELL ME?

The GGPLD and GGPULD are used in the BREEDPLAN analysis to calculate genomic predictions for over 20 traits, including Calving Ease, Milk, Average Daily Gain, Residual Feed Intake, Marbling, Docility and Carcase Weight.

Also included in the testing bundles are the 4 genetic conditions: Hypotrichosis, Dilutor, Idiopathic Epilepsy and Maple Syrup Urine Disease. These bundles will include Parent verification if the parents have a SNP profile to compare to.

HOW DO GENOMICS HELP ME?

SNP genotypes, along with pedigree information and performance information are incorporated into the calculation of BREEDPLAN EBV's. They assist in increasing the accuracy of an animal's EBV figures, by combining observed trait data, pedigree performance data and the genomic predictions. Genotype testing your animals will also benefit those related to them. Genomically enhanced EBV's will allow you to substantially enhance your breeding objectives by giving more accurate performance data at a younger age.

HOW TO SELECT THE RIGHT DNA TEST FOR YOU

The most appropriate DNA test for you and your operation will come down to several things:

- The animal being tested: Is this a calf you wish to Parent verify? Is this a male that will be used as a sire? Or is it a cow you wish to flush for embryos?
- What information do you wish to gain from conducting the test?
- Does the DNA test you are requesting meet the most current HAL regulations?

For help determining which test your animals require, contact the Herefords Australia office.



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