GLOSSARY

PBB – Performance Beef Breeders provide registry, DNA, financial, and marketing services to breed societies and members**.** https://www.pbbnz.com/

NZ Herefords along with other breeds are shareholders of PBB. NZ Herefords and Angus NZ each hold 500 of the 1450 total number of shares.

Beef Holdings – is the company that owns the building which hosts PBB, Breed Societies and other tenants. NZ Herefords have a 26% shareholding.

ABRI - Agricultural Business Research Institute (ABRI) from the University of New England (UNE) was established in 1968.

ABRI currently provides NZ Herefords with the software tools for cattle registration (ilR2) and display of the EBV results (Internet Solutions) as well as the genomic evaluation – BreedPlan Single Step.

AGBU - Animal Genetics & Breeding Unit was established at University of New England to support ABRI with research and development.

BreedPlan is the genetic across-herd system which provides the Single Step evaluation for the TransTasman data (eg NZ Herefords and Australia) which produces our EBVs. https://breedplan.une.edu.au/

Single Step BreedPlan uses genomic (DNA) information in addition to the pedigree and performance information used in a traditional BreedPlan analysis.

The analysis takes account of each animal's actual genetic relationship based on its genotype with all other genotyped animals, including those in the reference population.

EBVs - Estimated Breeding Value is the estimated genetic merit of an animal for each recorded production trait.

Helical - breed registry software platform, purpose-built for the cloud and genomics era. Designed by Dan Garrick and his team, for use by breed societies globally to deliver tools which maximize genomic and performance data. https://www.helicalco.com/

HAL – Herefords Australia Limited https://www.herefordsaustralia.com.au/

MLA – Meat and Livestock Australia (have supported development of BreedPlan)

AHA – American Herefords Association https://hereford.org/

WHC – World Hereford Council or depending on context "World Hereford Conference"

TransTasman BreedPlan Analysis, combining data from Namibia, Australia and New Zealand breed societies in a single analysis.

Breed Average: The averaged figure for each individual EBV across the newest year cohort. Any animal can be compared to this average to determine if that animal is above or below breed genetic average. A set of breed average EBVs should be enclosed in all BREEDPLAN reports and sale catalogues.

Outlier Report: highlights potential data recording errors that may have occurred. For example, incorrect measurements may have been recorded, incorrect animal details may have been recorded (eg. date of birth, sex) or animals may have been placed in an incorrect contemporary group. Alternatively, animals may just be exceptionally good or bad in outlier values. (see below)

Outlier: may refer to an animal which is significantly genetically superior/inferior to their contemporaries ie it 'outlies' from the expected norm.

Percentile Bands Table provides a comparison which allows you to establish whether an animal is above or below the current breed average EBVs. This can be taken further by comparing the animal's EBVs to the Percentile Bands Table to assess exactly where the animal ranks within the breed for each trait.

Phenotype of an animal refers to the physical characteristics of that animal – what we see.

Genotype: The genetic makeup of an animal.

This can be tested using Single Nucleotide Polymorphism (SNP) DNA test. Genomic SNP Tests are available through PBB with information on the Genomics tab of the Hereford website.

Genome: The genetic material of an animal.

Genomics: The study of the genome.

DNA: deoxyribonucleic acid, is the carrier of genetic information.

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

Microsatellite: also referred to as a MIP, was the first type of DNA testing available to breeders.

The reference population is the set of Hereford animals within the Hereford BreedPlan analysis that have both genotypes (SNP data) and phenotypes (performance records) for a particular trait.

BreedObject is the ABRI programme which creates Selection Indexes by combining BreedPlan EBVs into a single value and allow producers to identify animals that are most profitable in each production system.

nProve – free online tool produced by Beef+Lamb NZ to search for beef and sheep genetics across breeds.

DNA Service Providers:

- Neogen (GeneSeek)
- Weatherbys
- Zoetis

Igenity and GenSelect - are both commercial genomic only evaluations available to commercial farmers. They rank animals within herd but cannot be used to compare herds.

Homozygous Polled – A 'True Polled' animal and will only produce Polled (or Scurred) calves. They will not produce Horned calves.

Heterozygous Polled HPc or HPf: – Animal is Polled or Scurred and carries a Polled and Horned gene and can produce Polled, Horned (or Scurred) calves.

Homozygous Horned HH: – The animal is Horned and can produce Horned, Polled (or Scurred) calves.

Inbreeding is the mating of animals that are more closely related than the average degree of relationship within the population.

Line breeding is the strategic use of interbreeding to improve traits found in one family line.

Outcrossing is the opposite of inbreeding ie increasing the number of heterozygous pairs.

Autosomal recessive is one of several ways that a trait, disorder, or disease can be passed down through families. An autosomal recessive disorder means two copies of an abnormal gene must be present in order for the disease or trait to develop.

Genetic Conditions (GC) – also referred to as genetic defects or genetic abnormalities.

Hypotrichosis (HY)– is an autosomal recessive trait which results in loss of hair.

Idiopathic Epilepsy (IE) – is an autosomal recessive trait which starts with animals lying on their side with limbs extended in a rigid state followed by seizures.

Maple Syrup Urine Disease (MSUD) - is an autosomal recessive trait which results in calves born with symptoms of being slow and progresses to the animal throwing its head back and lying on its side unable to rise.

Mandibulofacial Dysostosis (MD) - is an autosomal recessive trait with the calf born with facial deformities.

Diluter (DL) – gene is a dominant gene so when a Hereford carrier is mated to an animal with black pigment eg a Friesian or an Angus, 50% cases will produce offspring with a diluted coat colour.

Delayed Blindness (DB) – is an autosomal recessive disorder caused by retinal degeneration within the eye. Cattle affected by DB are not born blind, but vision loss is noticeable near or just after one year of age. DB is caused by a recessive allele, which means that affected calves will only occur when two carrier animals are mated together.

- HYF=Hypotrichosis Free
- HYC=Hypotrichosis Carrier
- DLF=Dilutor Free
- DLC=Dilutor Carrier
- IEF=Idiopathic Epilepsy Free
- IEC=Idiopathic Epilepsy Carrier
- MSUDF=Maple Syrup Urine Disease Free
- MSUDC=Maple Syrup Urine Disease Carrier
- MDF=Mandibulofacial Dysostosis Free
- MDC=Mandibulofacial Dysostosis Carrier
- DBF = Delayed Blindness Free
- DBC = Delayed Blindness Carrier

How our Registry and Breeding Values work

Where is our registry held?
The NZ Herefords registry is currently held with **ABRI**. PBB manages the contract with ABRI on behalf of NZHA and passes the cost on to NZHA.

How do breeders enter information?
When breeders register a calf or submit raw data (such as weights), this is done through PBB.

- Some services are covered under NZHA's base agreement with PBB.
- Other services may incur additional charges, depending on what is required.

How are breeding values produced?
Each month:

- Pedigree and performance (phenotypic) data is sent from ABRI to BreedPlan evaluation.
- Genomic data (stored at Helical) is also included in the evaluation.
- BreedPlan runs the Trans-Tasman group analysis to produce our Single Step breeding values – EBVs.
- These breeding values (EBVs) are displayed through Internet Solutions (part of ABRI) and accessed via the NZHA website.

What's Changing?

NZHA is moving our registry database (pedigrees and raw data) from ABRI to Helical.

What this means for breeders:

- You will still enter registrations and raw data through PBB, just as you do now.
- You will no longer be required to request PBB to run prefilled spreadsheets as Helical will have prebuilt templates for you to use.
- BreedPlan will continue to run the monthly group analysis and produce breeding values.
- Breeding values will still be accessed via the NZHA website.
- The main difference is that results will be displayed on a new-look screen provided by Helical

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In short, the process for breeders stays largely the same — the change is mainly behind the scenes, with a new system hosting the registry and displaying result