

TALKING GENOMICS



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Why Performance Recording Still Matters with Genomic Testing

Genomics provides no value to the breeding value calculated for an animal in the absence of a well recorded & relevant genomic reference population.

You can contribute to the reference population for your stock by accurately performance recording your animals & submitting the data into your breed societies database.

A genomic reference population refers to a large group of animals that have both genotypes (i.e. genomic profiles) and phenotypes (i.e. performance measurements) available.

In industry genetic evaluations, such as those conducted by BREEDPLAN, Sheep Genetics and DataGene, the genomic reference population includes animals, and their associated genotypes and phenotypes, from industry funded, structured reference population programs, and animals in individual breeder herds or flocks.

The accuracy provided by genomics to the prediction of an animal's breeding value is determined by the size and composition of the genomic reference population that is available.

Specifically, the accuracy provided by genomics is influenced by:

- The size of the genomic reference population. i.e. how many genotyped animals have phenotypes for a particular trait.
- The heritability of the trait. i.e. a larger number of genotyped animals with phenotypes is required for traits that have a lower heritability (see Table 1).
- The effective population size. i.e. the more genetically diverse a population is, the larger the genomic reference population that is required.
- The genetic relationship between the animal for which the breeding value is being calculated and the animals in the genomic reference population. i.e. the more closely related an animal is to the animals in the genomic reference population, the more value genomics provides. Conversely, if an animal is not related to animals in the genomic reference population, genomics provides minimal value and can potentially lead to the calculation of biased breeding values.
- The relevance of the production system in which the phenotypes were collected.

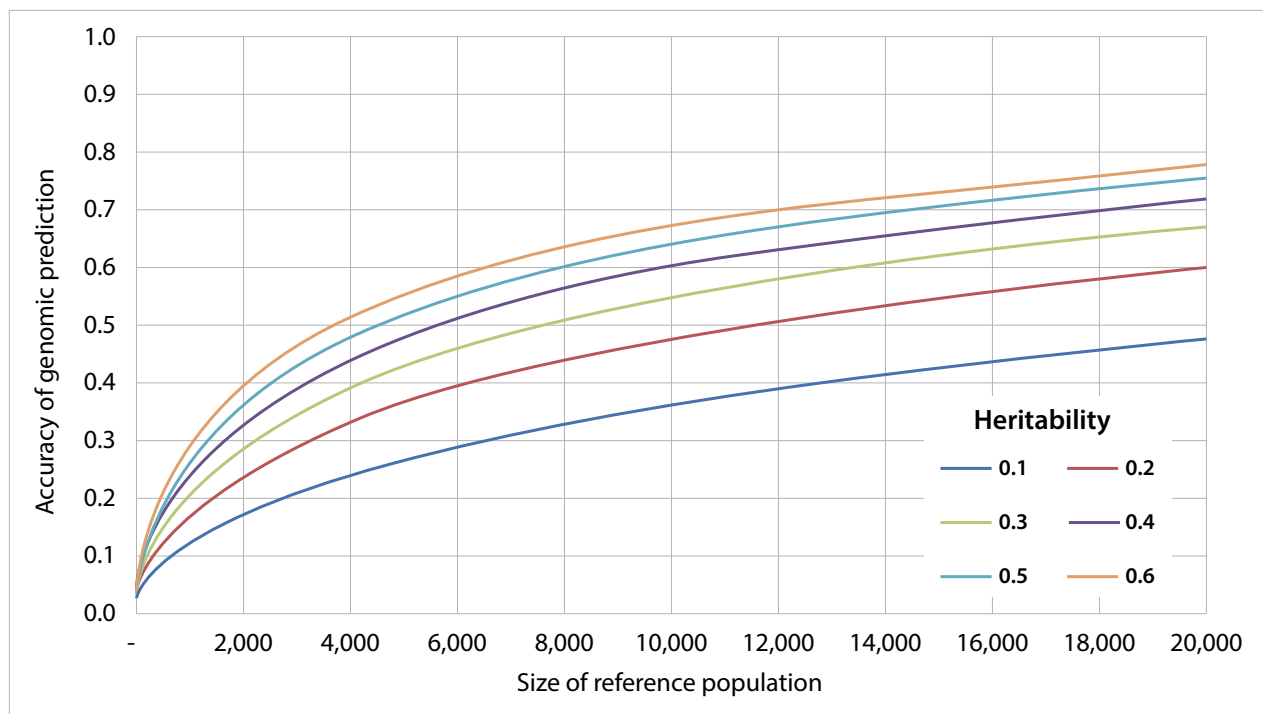
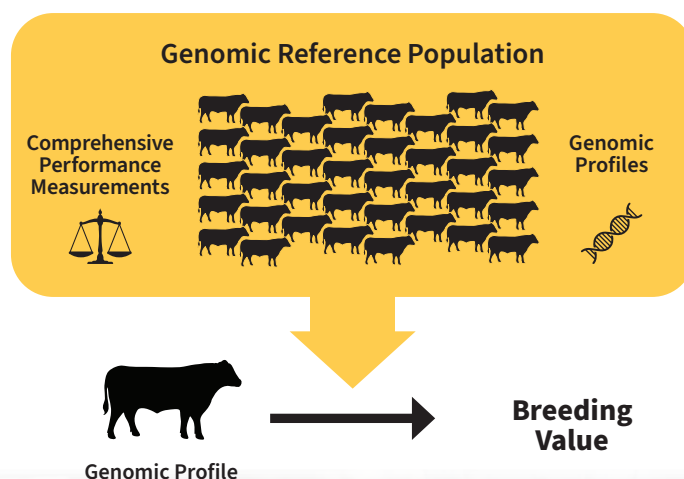


Table 1 : The accuracy of genomic selection as the size of the genomic reference population increases for traits with varying heritability.

In addition, the usefulness of a genomic reference population decreases over time with changes in the genetic makeup of the breeding population, so it is important that the reference population is routinely updated with new animals. By performance recording your animals accurately you are contributing to the reference population and the usefulness of genomics to your herd now and into the future.

Figure 1 : The existence of a well recorded, relevant genomic reference population is essential for genomic selection.



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