Department of Primary Industries
Department of Regional NSW

DPI Primefact

Genomics: Better insight into genetic merit

July 2023, Primefact PUB23/803, First edition
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Why should we consider using genomics?

Genomics for Beef Producers

The use of genomic information offers a powerful advantage to seed stock breeders and commercial producers in increasing the rate of genetic gain from breeding programs. Genomics incorporates using an animal's DNA to provide more accurate information on its genetic potential for a variety of traits which form the basis of selection indexes for economic merit. The genomic information for an animal is added to any other information, such as pedigree, the estimated breeding values (EBVs) of its parents, and its own performances, to predict the animal's breeding value.

There are some major advantages to the use of genomics.

The genetic makeup of an animal is set at conception, therefore genomic testing can be done as soon as an animal is born. This means we can gather information early on animals and start making decisions then when few phenotypic records are available. Thus, the generation interval is shortened and genetic gain is accelerated from being able to select early instead of having to wait for an animal to grow, or mature, to measure its phenotypic traits.

Figure 1. Bull standing in paddock in Trangie, NSW.

This is particularly beneficial for traits that can only be measured later, in life, like mature weight, as well as sex-limited traits such as female fertility or milk traits. This provides a large advantage in accelerating genetic progress throughout livestock populations. Similarly, eating quality traits cannot be measured on animals selected to be parents.

The use of genomic information can provide valuable insight into the genetic potential (e.g. Estimated Breeding Values provided by BREEDPLAN) in young bulls. Genomics provides another layer of information, complementary to the recording of traits and pedigree. The more information there is available, the higher the accuracy of selection and hence the greater the rate of genetic gain where younger selection candidates are considered. However, the best results

come from the use of genomics when an animal's relatives have had phenotypic recordings submitted.

Genomics also offers the advantage of being able to increase selection intensity, allowing producers to select the best-performing animals within a population. With genomics improving the accuracy of breeding values, producers can make more effective decisions on what animals to select for their breeding stock, ultimately leading to faster genetic progress in selected traits.

Using genomics also allows for better identification of genetic merit for traits that are hard or costly to measure, including feed efficiency, female fertility, disease resistance, and meat quality.

Valuable data are also provided by genomics to better assist when designing and optimising breeding programs such as mating strategies, and management of inbreeding. This leads to overall improved animal performance and herd quality.

Acknowledgements

This Primefact was written by Emily Johnston, a Genetics Development Officer within the Extensive Livestock Unit.

Further contributions and edits were made by Dr Sue Mortimer, Research Officer Quantitative Genetics, and Dr Tom Granleese, Research Officer Quantitative Genetics.