

Developing a Genomics Testing Strategy for Your Herd

Angus seedstock breeders across Australia now have access to the latest generation of breeding and genetic technology, genomics, with increasing numbers of Angus animals being genomically tested each year.

When combined with pedigree and performance information, genomic information adds an additional source of information for the calculation of Angus BREEDPLAN Estimated Breeding Values (EBVs), enabling the generation of EBVs with additional accuracy, and ultimately enabling more accurate selection decisions to be made.

Genomic testing is however a considerable expense and so any investment in testing seedstock animals needs to be carefully evaluated to maximise the benefits that are obtained.

Consideration 1: When will DNA Samples be Collected?

DNA samples for genomic testing can be collected on animals of any age, and so should be undertaken at a time that best fits in with other normal, routine management practices.

Irrespective of whether genomic testing is to be conducted, a good strategy is to collect hair samples on all calves at a young age (e.g. weaning) and store the samples for possible testing at a later date. To best preserve the sample, hair samples should be placed in either a plastic sealable sandwich bag or an envelope, clearly identified, and stored in a dry, dark environment.

If collecting hair samples, collection should not be done on very young calves (e.g. at birth). Hair samples must have clearly visible follicles before they are suitable for testing, which usually occurs from 3 – 4 months of age onwards.

Consideration 2: What DNA Samples will be Collected?

Tail hairs, semen straws, or tissue samples can be accepted by Angus Australia for genomic testing, with tail hairs being most commonly utilised.

When considering which sample type will be collected, it is important to consider that additional fees may apply for semen or tissue samples to cover the additional expenses associated with DNA extraction and storage.

Consideration 3: Which Genomic Product will be Utilised?

Angus BREEDPLAN currently incorporates genomic information from four different genomic products, being the i50K and HD50K products offered by Zoetis Animal Genetics, and the GeneSeek Genomic Profiler (GGP-LD and GGP-HD) products offered by GeneSeek AustralAsia (GAA).

When making a decision as to what genomic product will be used, it is important to consider:

- The density of the genomic product. In most cases, testing animals with a low density product (i.e. i50K or GGP-LD) is adequate for the inclusion in Angus BREEDPLAN. A high density product (i.e. HD50K or GGP-HD) would only be considered if it was deemed advantageous to store a higher density genetic profile for inclusion in future research, or to assist the research efforts of genotyping companies.
- The traits for which genomic predictions will be provided. Genomic predictions are incorporated into Angus BREEDPLAN for 14 traits from the Zoetis i50K and HD50K products, and 11 traits from the GeneSeek GGP-LD and GGP-HD products.
- The accuracy of the genomic predictions that will be provided. The additional accuracy provided by the incorporation of genomics will differ by product, by trait, and for each individual animal subject to the accuracy of its existing EBV.

Information regarding each different genomic product, including the traits for which genomic predictions are provided, and the additional EBV accuracy provided by the inclusion of genomic predictions from each product is available from the Angus Australia website.



Consideration 4: What Animals will be Tested?

In contrast to performance information, there is no requirement to collect DNA samples for all animals in a contemporary group.

Testing can consequently be conducted as many or few animals as desired, depending on the objective. Common testing strategies include:

- testing an individual animal
- strategically testing a group of animals of specific interest, for example candidate bulls for use in a breeding program
- testing an entire calf drop



When making a decision as to what animals will be tested, it is important to consider the incorporation of genomic information is of more value when an animal's existing EBV has low accuracy. For example:

- When an animal is very young
- For traits that are hard to measure, or traits that cannot be measured prior to an animal entering the breeding herd
- For traits that have a low heritability
- In situations where collecting effective performance information is problematic, such as in small herds, or when an animal has been removed from its contemporary group

- In situations where little information is recorded with Angus BREEDPLAN for the animal, such as recently imported overseas sires

It is also important to be mindful that genomic information is of limited value if the animals being tested are not related to the animals that were used to develop the genomic product. For this reason, the genomic testing should only be conducted on black Angus animals (or Red Angus animals with at least one black Angus parent).

Consideration 5: Cost of Testing

The cost of testing with each different genomic product differs, depending on the product being utilised.

Information regarding the cost of testing with each different genomic product is available from the Angus Australia website.

When considering cost, it is important to consider that genomic testing does include several benefits that are additional to the calculation of EBVs with increased accuracy, such as parentage verification (when candidate parents have also been genomically tested), and the ability to add-on testing for genetic conditions at a lower cost.

Consideration 6: Obtaining Advice

Optimal utilisation of genomic technology will vary with each individual seedstock enterprise.

In addition to being a considerable investment, utilisation of genomic testing should be considered in association with other components of the seedstock breeding program, including the performance recording program being undertaken, and the use of reproductive technologies.

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