The Beef CRC for Angus product that was developed by the Cooperative Research Centre for Beef Genetic Technologies (Beef CRC) between 2005 and 2012 is one of several sources of genomic information that are incorporated into Angus BREEDPLAN.

This fact sheet provides technical details regarding the Beef CRC product and the associated incorporation of Beef CRC genomic predictions into Angus BREEDPLAN.

Understanding the Beef CRC for Angus Product
The Beef CRC product assesses the genetic makeup of black Angus cattle at approximately 770,000 locations across the animal’s genome (known as SNPs or single nucleotide polymorphisms) to obtain a genetic profile for the animal, which is used to calculate a genomic prediction of an animal’s genetic merit.

The Beef CRC product calculates genomic predictions for many economically important traits, including:
- Tenderness
- Marbling
- Meat Yield
- Reproductive Performance
- Net Feed Intake

Incorporation of Beef CRC for Angus Product within Angus BREEDPLAN
As with other genomic tests, the Beef CRC genomic predictions are best utilised by incorporation into Angus BREEDPLAN, whereby an estimate of an animal’s breeding value can be calculated by combining the genomic prediction with the pedigree and performance information that has been collected on the animal and its relatives.

To facilitate the incorporation of the Beef CRC genomic predictions into Angus BREEDPLAN, the Animal Genetics and Breeding Unit (AGBU) in Armidale has undertaken research to determine the appropriate emphasis that should be placed on the genomic information in the calculation of the BREEDPLAN EBVs.

The research examined the relationship (or genetic correlation) between the genomic prediction for 1487

---

**Fast Facts**

- The Beef CRC for Angus product that was developed by the Cooperative Research Centre for Beef Genetic Technologies between 2005 and 2012 is one of three sources of genomic information that are incorporated into Angus BREEDPLAN.
- The Beef CRC product assesses the genetic makeup of black Angus cattle at approximately 770,000 locations across the animal’s genome (known as SNPs or single nucleotide polymorphisms) to obtain a genetic profile for the animal, which is used to calculate a genomic prediction of an animal’s genetic merit.
- As with other genomic tests, the Beef CRC genomic predictions are best utilised by incorporation into Angus BREEDPLAN, whereby the genomic predictions are combined with pedigree and performance information to calculate EBVs with additional accuracy.
- Beef CRC genomic predictions are incorporated into Angus BREEDPLAN for 4 traits.
animals and the performance (or phenotypic) information that has been recorded with Angus BREEDPLAN for each respective trait.

**Traits to be Incorporated into Angus BREEDPLAN**

Based on the results of the research and the subsequent recommendations provided by AGBU, genomic predictions for 4 traits are incorporated into Angus BREEDPLAN, including:

- Carcase Weight
- Rib Fat
- Rump Fat
- Intramuscular Fat

**Emphasis Given to Beef CRC for Angus Genomic Predictions When Incorporating in BREEDPLAN**

The emphasis given to the Beef CRC genomic predictions within Angus BREEDPLAN can be described as the accuracy of the EBV that would be generated if the EBV was calculated from only the genomic prediction (ie. there was no other information recorded with BREEDPLAN).

The accuracy of the EBV that would be generated for each trait from the genomic prediction alone is outlined in Table 1.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcase Weight</td>
<td>25 %</td>
</tr>
<tr>
<td>Rib Fat</td>
<td>51 %</td>
</tr>
<tr>
<td>Rump Fat</td>
<td>36 %</td>
</tr>
<tr>
<td>Intramuscular Fat</td>
<td>33 %</td>
</tr>
</tbody>
</table>

**Additional Accuracy Provided by Inclusion of Beef CRC for Angus in BREEDPLAN**

While Table 1 provides the accuracy of the EBV that will be calculated from the Beef CRC genomic predictions alone, in practice, the genomic predictions are incorporated with the pedigree and performance information recorded with Angus BREEDPLAN.

The additional accuracy provided by the incorporation of the Beef CRC genomic predictions at differing levels of existing EBV accuracy is outlined in Table 2.

As is evident from the table, the additional accuracy that is provided by the incorporation of the genomic prediction differs subject to the accuracy of the animal’s existing EBV, with the most additional accuracy being provided in situations where an animal’s existing EBV has low accuracy. For example:

- When an animal is very young
- 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

The incorporation of Beef CRC genomic predictions will add minimal accuracy to the EBVs for animals whose existing EBV has high accuracy.

**Analytical Considerations When Incorporating Beef CRC for Angus Genomic Predictions into Angus BREEDPLAN**

The analytical process that is used to incorporate Beef CRC genomic predictions into Angus BREEDPLAN includes:

- The genomic predictions for an animal are only incorporated into the calculation of the EBVs for the individual animal itself. The genomic predictions do not contribute to the EBVs for the animal’s relatives (eg. its parents or progeny).

- Likewise, the genomic prediction for a trait is only incorporated into the calculation of the respective BREEDPLAN EBV for that individual trait. The genomic prediction is not incorporated into the calculation of the BREEDPLAN EBV for correlated (or related) traits.

- In situations where multiple genomic predictions are available on an animal for an individual trait (eg. GeneSeek GGP, Zoetis HD50K, Beef CRC), the genomic prediction that is given the highest emphasis within BREEDPLAN (as per Table 1) will be used in the calculation of EBVs for the animal.

**Changes to BREEDPLAN EBVs**

Changes to the EBVs of an animal are expected with the incorporation of Beef CRC genomic predictions for the animal into BREEDPLAN.

The magnitude of the change in EBVs will differ for each individual animal depending on factors such as the accuracy of the animal’s existing EBV, the magnitude of the individual animal’s genomic prediction, and the relative emphasis that is used when incorporating the genomic prediction for each respective trait within the BREEDPLAN analysis.
Animals for which Beef CRC Genomic Predictions are Incorporated into Angus BREEDPLAN

The Beef CRC for Angus product is not commercially available at present.

Beef CRC genomic predictions are only incorporated into Angus BREEDPLAN for animals that were included in the research conducted by the Beef CRC.

Further Information

To further discuss the Beef CRC for Angus product, please contact either Angus Australia’s Breed Development & Innovation Manager, Carel Teseling on (02) 6773 4602 or carel@angusaustralia.com.au, or Angus Australia’s Education, Extension & Youth Manager, Andrew Byrne on (02) 6773 4618 or andrew@angusaustralia.com.au.

Beef CRC genomic predictions are incorporated into Angus BREEDPLAN for 4 important carcase traits, being Carcase Weight, Rib Fat, Rump Fat and Intramuscular Fat.