TIPS & TOOLS

Zoetis i50K for Angus

The Zoetis i50K for Angus product (i50K) is one of several sources of genomic information that are incorporated into Angus BREEDPLAN.

This fact sheet provides technical details regarding the i50K product and the associated incorporation of i50K genomic predictions into Angus BREEDPLAN.

Understanding the Zoetis i50K for Angus Product

The i50K product uses a low density DNA test to assess the genetic makeup of black Angus cattle at more than 19,000 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 i50K is an evolution of the Zoetis HD50K for Angus (HD50K) product, providing a lower density, lower cost version of the HD50K product. The i50K delivers genomic predictions for the same suite of traits and with comparable accuracy to the HD50K.

Traits included in Zoetis i50K for Angus Product

The i50K product calculates genomic predictions for 22 traits, including:

Calving Ease Direct	Carcase Weight
Calving Ease Daughters	Eye Muscle Area
Birth Weight	Rib Fat
Gestation Length	Rump Fat
Weaning Weight	Retail Beef Yield
Yearling Weight	Intramuscular Fat
Final Weight	NFI (Feedlot)
Mature Cow Weight	NFI (Post Weaning)
Milk	Dry Matter Intake
Scrotal Size	Feedlot Daily Gain
Days to Calving	Tenderness

Incorporation of Zoetis i50K for Angus Product within Angus BREEDPLAN

As with other genomic tests, the i50K 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

Fast Facts

- The i50K for Angus product (i50K) that is commercially available from Zoetis is one of several sources of genomic information that are incorporated into Angus BREEDPLAN
- The i50K product uses a low density DNA test to assess the genetic makeup of black Angus cattle at more than 19,000 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 i50K is an evolution of the Zoetis HD50K for Angus (HD50K) product, providing a lower density, lower cost version of the HD50K product. The i50K delivers genomic predictions for the same suite of traits and with comparable accuracy to the HD50K.
- As with other genomic tests, the i50K 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
- i50K genomic predictions are incorporated into Angus BREEDPLAN for 14 traits

the animal and its relatives.

To facilitate the incorporation of the i50K 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.

Given the genomic predictions from the i50K product have comparable accuracy to those from the HD50K product, genomic predictions are incorporated in Angus BREEDPLAN for the same traits from both Zoetis products (ie. i50K & HD50K). Likewise, the same emphasis is placed on the i50K and HD50K genomic predictions within Angus BREEDPLAN.

Traits to be Incorporated into Angus BREEDPLAN

Based on the results of the research and the subsequent recommendations provided by AGBU, genomic predictions from the Zoetis i50K product are incorporated into Angus BREEDPLAN for 14 traits, including:

Calving Ease Direct	Milk
Birth Weight	Scrotal Size
Gestation Length	Carcase Weight
Weaning Weight	Eye Muscle Area
Yearling Weight	Rib Fat
Final Weight	Rump Fat
Mature Cow Weight	Intramuscular Fat

For traits that are not incorporated into BREEDPLAN, there was either an insufficient relationship between the genomic prediction and the available performance information, considerable variation in the relationship between the genomic prediction and the available performance information, and/or insufficient performance information available on which to examine the relationship with the genomic prediction.

Emphasis Given to Zoetis i50K for Angus Genomic Predictions when Incorporating in BREEDPLAN

The emphasis given to the 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 i50K genomic prediction alone is outlined in Table 1.

Table 1 : Accuracy of BREEDPLAN EBV Calculated from Zoetis i50K Genomic Prediction Alone

Trait	Accuracy
Calving Ease Direct	41 %
Birth Weight	46 %
Gestation Length	56 %
200 Day Growth	43 %
400 Day Weight	50 %
600 Day Weight	56 %
Mature Cow Weight	59 %
Milk	47 %
Scrotal Size	62 %
Carcase Weight	42 %
Eye Muscle Area	33 %
Rib Fat	42 %
Rump Fat	35 %
Intramuscular Fat	27 %

Additional Accuracy Provided by Inclusion of Zoetis i50K for Angus in BREEDPLAN

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

The additional accuracy provided by the incorporation of the genomic prediction 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
- For traits that are hard to measure, or traits that can not 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

The incorporation of i50K genomic predictions will add minimal accuracy to the EBVs for animals whose existing EBV has high accuracy.

Table 2 : Additional Accuracy of BREEDPLAN EBV When Zoetis i50K Genomic Prediction Is Incorporated				
Trait	Initial EBV Accuracy			
	20 %	40 %	60 %	80 %
Calving Ease Direct	+24 %	+13 %	+6 %	+2 %
Birth Weight	+29 %	+16 %	+7 %	+2 %
Gestation Length	+38 %	+23 %	+11 %	+3 %
200 Day Growth	+26 %	+14 %	+6 %	+2 %
400 Day Weight	+32 %	+19 %	+9 %	+2 %
600 Day Weight	+38 %	+23 %	+11 %	+3 %
Mature Cow Weight	+40 %	+25 %	+12 %	+4 %
Milk	+30 %	+17 %	+8 %	+2 %
Scrotal Size	+43 %	+27 %	+14 %	+4 %
Carcase Weight	+25 %	+14 %	+6 %	+2 %
Eye Muscle Area	+18 %	+9 %	+4 %	+1 %
Rib Fat	+ 25%	+ 14%	+6 %	+2 %
Rump Fat	+19 %	+10 %	+4 %	+1 %
Intramuscular Fat	+13 %	+ 6 %	+3 %	+1 %

* For example, if an animal had a 200 Day Growth EBV with an accuracy of 60%, incorporation of the i50K genomic prediction would increase the accuracy of the EBV to 66%.

Analytical Considerations When Incorporating Zoetis i50K for Angus Genomic Predictions into Angus BREEDPLAN

The analytical process that is used to incorporate i50K 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 animals have been genotyped on multiple occasions with the i50K product, or have been genotyped with both the i50K and HD50K product), the genomic predictions from the most recent genotype will be incorporated into BREEDPLAN.
- In situations where genomic predictions from multiple genomic companies are available on an animal for an individual trait (e.g. GeneSeek, Zoetis, Beef CRC), the genomic prediction that is given the highest emphasis within BREEDPLAN will be used in the calculation of EBVs for the animal.

Changes to BREEDPLAN EBVs

Changes to the EBVs of an animal are expected when genomic predictions for the animal are incorporated 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.

Use of Zoetis i50K for Red Angus, or Animals on Multibreed Register

Research has shown that the accuracy of a genomic prediction erodes considerably as the relationship between the animal being tested, and the animals on which the genomic prediction was developed decreases.

The Zoetis i50K for Angus product has been developed using black Angus animals only, and accordingly, only black Angus animals should be considered for testing with the Zoetis i50K genomic prediction.

The accuracy of the i50K genomic predictions for Red Angus animals, or animals recorded on the Multibreed Register is unknown.

Further Information

To further discuss the Zoetis i50K 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. Information is also available by contacting staff at Zoetis on 1300 768 400.