

UNDERSTANDING THE TRANSTASMAN ANGUS CATTLE EVALUATION (TACE)

What is the TransTasman Angus Cattle Evaluation?

The TransTasman Angus Cattle Evaluation (TACE) is the genetic evaluation program adopted by Angus Australia for Angus and Angus infused beef cattle. TACE uses Best Linear Unbiased Prediction (BLUP) technology to produce Estimated Breeding Values (EBVs) of recorded cattle for a range of important production traits (e.g. weight, carcase, fertility).

TACE includes pedigree, performance and genomic information from the Angus Australia and New Zealand Angus Association databases to evaluate the genetics of animals across Australia and New Zealand.

TACE analyses are conducted by the Agricultural Business Research Institute (ABRI), using beef genetic evaluation software developed by the Animal Genetics and Breeding Unit (AGBU), a joint institute of NSW Agriculture and the University of New England, and Meat and Livestock Australia Limited (MLA).

What is an EBV?

An animal's breeding value can be defined as its genetic merit for each trait. While it is not possible to determine an animal's true breeding value, it is possible to estimate it. These estimates of an animal's true breeding value are called EBVs (Estimated Breeding Values).

EBVs are expressed as the difference between an individual animal's genetics and a historical genetic level (i.e. group of animals) within the TACE genetic evaluation, and are reported in the units in which the measurements are taken.

Using EBVs to Compare the Genetics of Two Animals

TACE EBVs can be used to estimate the expected difference in the genetics of two animals, with the expected difference equating to half the difference in the EBVs of the animals, all other things being equal (e.g. they are joined to the same animal/s).

For example, a bull with a 200 Day Growth EBV of +60 would be expected to produce progeny that are, on average, 10 kg heavier at 200 days of age than a bull with a 200 Day Growth EBV of +40 kg (i.e. 20 kg difference between the sire's EBVs, then halved as the sire only contributes half the genetics).

Or similarly, a bull with an IMF EBV of +3.0 would be expected to produce progeny with on average, 1% more intramuscular fat in a 400 kg carcase than a bull with a IMF EBV of +1.0 (i.e. 2% difference between the sire's EBVs, then halved as the sire only contributes half the genetics).

Using EBVs to Benchmark an Animal's Genetics with the Breed

EBVs can also be used to benchmark an animal's genetics relative to the genetics of other Angus or Angus infused animals in Australia and New Zealand.

To benchmark an animal's genetics relative to other Angus animals, an animal's EBV can be compared to the EBV reference tables, which provide:

- the breed average EBV
- the percentile bands table

The current breed average EBV is listed on the bottom of each page in this publication, while the current EBV reference tables are included at the end of these introductory notes.

For easy reference, the percentile band in which an animal's EBV ranks is also published in association with the EBV.

Considering Accuracy

An accuracy value is published with each EBV, and is usually displayed as a percentage value immediately below the EBV.

The accuracy value provides an indication of the reliability of the EBV in estimating the animal's genetics (or true breeding value), and is an indication of the amount of information that has been used in the calculation of the EBV.

EBVs with accuracy values below 50% should be considered as preliminary or of low accuracy, 50-74% as of medium accuracy, 75-90% of medium to high accuracy, and 90% or greater as high accuracy.

Description of TACE EBVs

EBVs are calculated for a range of traits within TACE, covering calving ease, growth, fertility, maternal performance, carcase merit, feed efficiency and structural soundness. A description of each EBV included in this publication is provided on the following pages.

UNDERSTANDING ESTIMATED BREEDING VALUES (EBVS)

BIRTH

Calving Ease Direct	%	Genetic differences in the ability of a sire's calves to be born unassisted from 2 year old heifers.	Higher EBVs indicate fewer calving difficulties in 2 year old heifers.
Calving Ease Daughters	%	Genetic differences in the ability of a sire's daughters to calve unassisted at 2 years of age.	Higher EBVs indicate fewer calving difficulties in 2 year old heifers.
Gestation Length	days	Genetic differences between animals in the length of time from the date of conception to the birth of the calf.	Lower EBVs indicate shorter gestation length.
Birth Weight	kg	Genetic differences between animals in calf weight at birth.	Lower EBVs indicate lighter birth weight.

GROWTH

200 Day Growth	kg	Genetic differences between animals in live weight at 200 days of age due to genetics for growth.	Higher EBVs indicate heavier live weight.
400 Day Weight	kg	Genetic differences between animals in live weight at 400 days of age.	Higher EBVs indicate heavier live weight.
600 Day Weight	kg	Genetic differences between animals in live weight at 600 days of age.	Higher EBVs indicate heavier live weight.
Mature Cow Weight	kg	Genetic differences between animals in live weight of cows at 5 years of age.	Higher EBVs indicate heavier mature weight.
Milk	kg	Genetic differences between animals in live weight at 200 days of age due to the maternal contribution of its dam.	Higher EBVs indicate heavier live weight.

FERTILITY

Days to Calving	days	Genetic differences between animals in the time from the start of the joining period (i.e. when the female is introduced to a bull) until subsequent calving.	Lower EBVs indicate shorter time to calving.
Scrotal Size	cm	Genetic differences between animals in scrotal circumference at 400 days of age.	Higher EBVs indicate larger scrotal circumference.

CARCASE

Carcase Weight	kg	Genetic differences between animals in hot standard carcass weight at 750 days of age.	Higher EBVs indicate heavier carcass weight.
Eye Muscle Area	cm ²	Genetic differences between animals in eye muscle area at the 12/13th rib site in a 400 kg carcass.	Higher EBVs indicate larger eye muscle area.
Rib Fat	mm	Genetic differences between animals in fat depth at the 12/13th rib site in a 400 kg carcass.	Higher EBVs indicate more fat.
Rump Fat	mm	Genetic differences between animals in fat depth at the P8 rump site in a 400 kg carcass.	Higher EBVs indicate more fat.
Retail Beef Yield	%	Genetic differences between animals in boned out saleable meat from a 400 kg carcass.	Higher EBVs indicate higher yield.
Intramuscular Fat	%	Genetic differences between animals in intramuscular fat (marbling) at the 12/13th rib site in a 400 kg carcass.	Higher EBVs indicate more intramuscular fat.

FEED EFFICIENCY

Net Feed Intake (Feedlot)	kg/day	Genetic differences between animals in feed intake at a standard weight and rate of weight gain when animals are in a feedlot finishing phase.	Lower EBVs indicate more feed efficiency.
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TEMPERAMENT

Docility	%	Genetic differences between animals in temperament.	Higher EBVs indicate better temperament.
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STRUCTURE

Front Feet Angle	%	Genetic differences between animals in desirable front feet angle (strength of pastern, depth of heel).	Higher EBVs indicate more desirable structure.
Front Feet Claw Set	%	Genetic differences between animals in desirable front feet claw set structure (shape and evenness of claw).	Higher EBVs indicate more desirable structure.
Rear Feet Angle	%	Genetic differences between animals in desirable rear feet angle (strength of pastern, depth of heel).	Higher EBVs indicate more desirable structure.
Rear Leg Hind View	%	Genetic differences between animals in desirable rear leg structure when viewed from behind.	Higher EBVs indicate more desirable structure.
Rear Leg Side View	%	Genetic differences between animals in desirable rear leg structure when viewed from the side.	Higher EBVs indicate more desirable structure.

SELECTION INDEXES

Angus Breeding Index	\$	Genetic differences between animals in net profitability per cow joined in a typical commercial self replacing herd using Angus bulls. This selection index is not specific to a particular production system or market end-point, but identifies animals that will improve overall profitability in the majority of commercial grass and grain finishing beef production systems.	Higher selection index values indicate greater profitability.
Domestic Index	\$	Genetic differences between animals in net profitability per cow joined in a commercial self replacing herd targeting the domestic supermarket trade.	Higher selection index values indicate greater profitability.
Heavy Grain Index	\$	Genetic differences between animals in net profitability per cow joined in a commercial self replacing herd targeting pasture grown steers with a 200 day feedlot finishing period for the grain fed high quality, highly marbled markets.	Higher selection index values indicate greater profitability.
Heavy Grass Index	\$	Genetic differences between animals in net profitability per cow joined in a commercial self replacing herd targeting pasture finished steers.	Higher selection index values indicate greater profitability.