

CHANGES TO STRUCTURAL SOUNDNESS EBVS



Commonly Asked Questions

Some considerable changes will be made to the Structural Soundness EBVs that are published on Australian Angus cattle in the mid December 2020 TransTasman Angus Cattle Evaluation.

1. Why have the changes been made?

The Structural Soundness EBVs have been the subject of considerable discussion amongst Angus breeders in recent times, culminating in the need to make improvements being highlighted as a priority by Angus Australia's Genetic Evaluation Consultative Committee.

Angus Australia has listened to this feedback and has undertaken a comprehensive review of the Structural Soundness EBVs that are published.

2. What Structural Soundness EBVs will now be published?

The five Structural Soundness EBVs previously published will be replaced by two new EBVs, being Foot Angle and Claw Set.

Structural					Structural	
Front Feet Angle	Front Feet Claw Set	Rear Feet Angle	Rear Leg Hind View	Rear Leg Side View	Foot Angle	Claw Set
+14	+25	+3	+1.8	+0.1	+0.82	+0.46
89%	90%	84%	65%	79%	98%	98%

Foot Angle EBVs are estimates of genetic differences in foot angle (strength of pastern, depth of heel), with lower Foot Angle EBVs indicating an animal is expected to produce progeny with more desirable foot angle, being a 45-degree angle at the pastern joint with appropriate toe length and heel depth.

Claw Set EBVs are estimates of genetic differences in claw set structure (shape and evenness of claws), with lower Claw Set EBVs indicating an animal is expected to produce progeny with more desirable claw structure, being toes that are symmetrical, even and appropriately spaced.

EBVs for Rear Leg Hind View and Rear Leg Side View will still be calculated and made available upon request, however they will not be routinely published.

3. How do I interpret the new Structural Soundness EBVs?

The new Foot Angle and Claw Set EBVs are expressed as expected differences in score units, rather than the percentage of progeny with acceptable structure.

Lower Foot Angle and Claw Set EBVs are more favourable and identify animals that will produce progeny with more desirable structure (i.e. a score closer to 5).

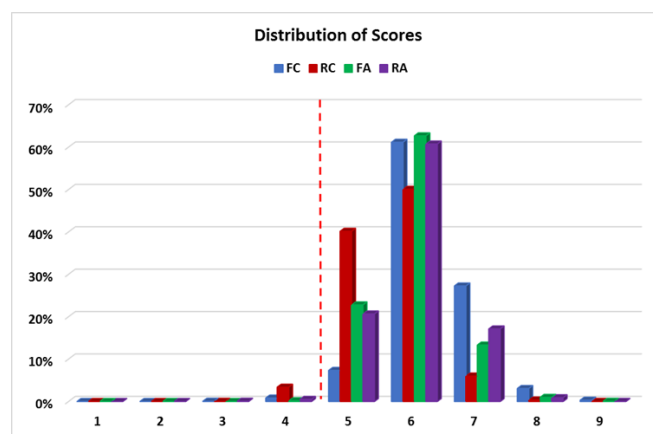
For example, if one sire has a Claw Set EBV of +0.46, and another sire has a Claw Set EBV of +1.20, the first sire would be expected to produce progeny that have, on average, 0.37 (i.e. the EBV difference of 0.74, divided by 2) of a score more desirable structure, all other things being equal.

4. Have any changes been made to the analytical software that is used to calculate the EBVs?

The new Foot EBVs will be calculated using completely new analytical software that includes a number of improvements, including:

- Adoption of a linear analytical model (by comparison to the threshold model that was previously used)
- Facility to incorporate multiple scores per animal
- Facility to incorporate scores on mature females
- Facility to incorporation genomic information into the calculation of EBVs

One feature to note is that the new linear analytical model only incorporates scores of 5 and above in the calculation of EBVs. The removal of scores of 1 – 4 does not result in the removal of many scores from the analysis (i.e. the vast majority of animals have a score of 5 and above), but it considerably reduces the complexity required in the analytical model.

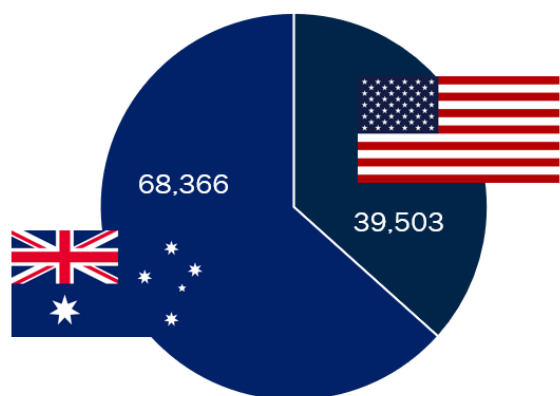


The inclusion of scores of 1 – 4 will be reviewed in the future if the distribution of the scores submitted warrant it.

5. I understand the Structural Soundness EBVs are now calculated in a joint analysis with North America. Is this correct?

A feature of the new Foot Angle and Claw Set EBVs is that the analysis is now conducted jointly with the American and Canadian Angus Associations.

In this manner, scores collected on animals in Australia, the United States and Canada have been combined for analysis, with the resultant EBVs calculated for Angus animals in Australia and North America now being directly comparable.



Number of scores incorporated into the new Foot Angle and Claw Set EBVs

Regrettably, the scores collected on animals in New Zealand are no longer incorporated into the calculation of Foot Angle and Claw Set EBVs, despite having been incorporated into the previous Structural Soundness EBVs. Scores on New Zealand animals represented approximately 5% of data in the previous analysis.

6. How do I compare EBVs on Australian animals with EPDs on North American animals?

An EBV (Estimated Breeding Value) is simply twice an EPD (Estimated Progeny Difference).

So to convert the Foot Angle or Claw Set EPD on a North American animal, simply multiply the EPD by two and it will give the equivalent EBV in Australia.

Likewise, to convert the Foot Angle or Claw Set EBVs on an Australian animal, divide the EBV by 2 and it will produce the equivalent EPD in North America.

7. Has there been any changes to the structural scores that need to be collected on animals?

While considerable changes will be made to the manner in which Structural Soundness EBVs are calculated and displayed, the scoring system by which the feet and leg structure of Angus animals is assessed for inclusion in the TransTasman Angus Cattle Evaluation remains unchanged.

Animals will still be assessed on a 1 – 9 scoring system, with front and back feet assessed separately for foot angle and claw set.

Scores for rear leg side and hind view can still be submitted, however EBVs will not be published for these traits as standard.

8. Do I still submit structural scores to Angus Australia in the same way that I did before?

Yes. Structural scores are still submitted to Angus Australia in exactly the same manner as they were before.

The increased complexity associated with conducting the analysis jointly with the American and Canadian Angus Associations does however mean that structural scores will need to be submitted to Angus Australia seven days prior to the submission deadline for other performance information.

So if the submission deadline for a particular analysis is the 1st day of the month, the structural scores will need to be submitted to Angus Australia on the 23rd or 24th of the preceding month.

9. What about breeder collected scores. Can I score my own animals or do I need to use an independent accredited scorer?

In a move to increase the number of animals being structurally scored, particularly yearling and mature females, breeder collected scores will now be accepted for inclusion in the calculation of Structural Soundness EBVs, alongside scores collected by independent, accredited assessors.

It is suggested that independent accredited assessors be used for the collection of scores on sale animals, or in situations where the breeder is not confident with scoring their animals.

The acceptance of breeder collected scores is specifically intended to facilitate an increase in the recording of scores on replacement heifers and mature females.

A “Paddock Guide to Structural Scoring for Genetic Evaluation” has been developed and is available from Angus Australia to assist any breeders wishing to collect structural scores for their animals.

10. Are breeder collected scores given the same weighting in the calculation of EBVs as to scores collected by an independent, accredited assessor?

Research has shown that breeder collected scores have similar heritability to scores collected by an independent, accredited assessor, and so all scores are given the same weighting in the calculation of EBVs.

That said, details as to whether scores have been collected by the breeder, or an independent, accredited assessor are recorded so the usefulness of breeder collected scores can be monitored, and changes made to the manner in which the scores are analysed if it is warranted.

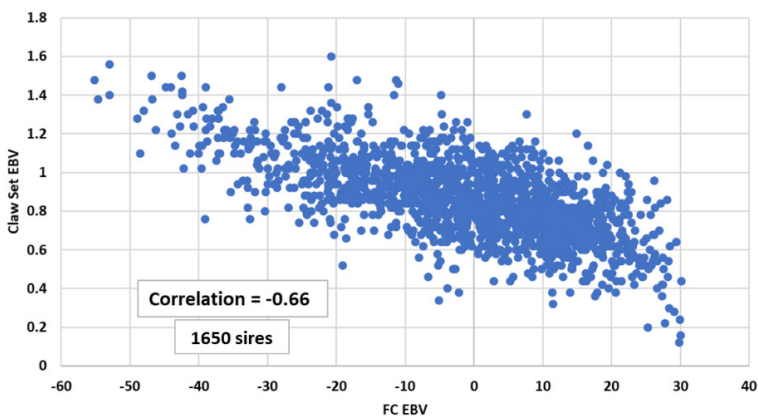


11. Have the Structural Soundness EBVs for animals changed as a result of the changes that have been made?

The modifications that have been made to the manner in which Structural Soundness EBVs are calculated has resulted in considerable changes to the EBVs that are published for animals, and in particular, to the ranking of animals for foot angle and claw set.

For example, if we compare the previous Front Foot Claw Set EBVs with the new Claw Set EBVs for sires with 5 or more progeny scores, the correlation between the previous and new EBVs is 0.66. Note: the negative correlation reflects the change from higher EBVs being more favourable to lower EBVs being more favourable.

FC EBV v Claw Set EBV
Sires with >= 5 Progeny



Similar re-ranking of animals is observed between the previous Front Foot Angle EBVs and the new Foot Angle EBVs.

12. Do the new Foot Angle & Claw Set EBVs predict progeny differences?

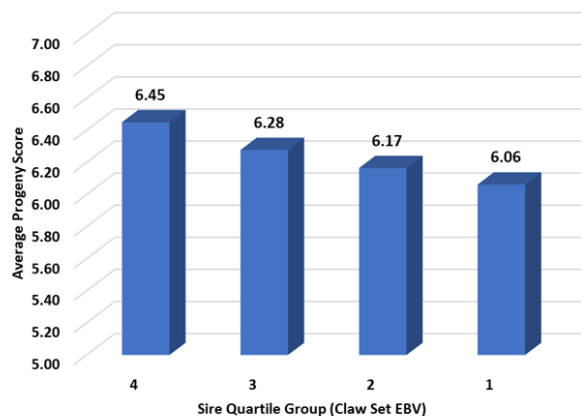
To validate the new EBVs, the 1650 sires with 5 or more progeny scores were ranked on their new EBV and drafted into 4 quartiles.

The average progeny score of sires in each quartile, along with the percentage of progeny with a score of 5 or 6, were then used to assess whether the EBVs being calculated were reflective of the differences observed in progeny scores.

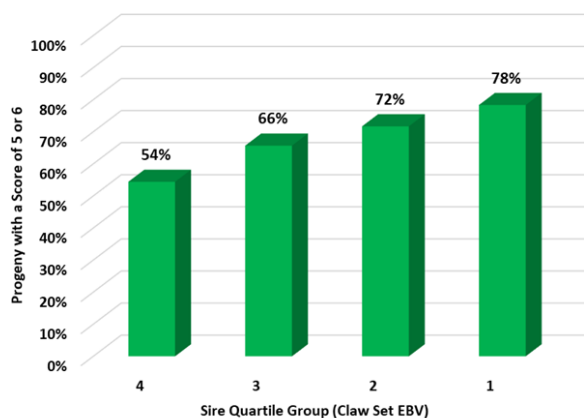
As illustrated by the graphs, sires in the highest quartile for Claw Set EBV, had progeny with an average front foot claw set score of 6.06, by comparison to sires in the lowest quartile who had progeny with an average front foot claw

set score of 6.45. Likewise, 78% of progeny from sires in the highest quartile had a front foot claw set score of 5 or 6, by comparison to only 54% of progeny from sires in the lowest quartile.

Average Progeny Score (Front Claw Set)
Sires with >= 5 Progeny



Progeny With A Score of 5 or 6 (Front Claw Set)
Sires with >= 5 Progeny



Similar results were observed when sires were drafted into quartiles based on their Foot Angle EBV.

13. Who do I contact should I have any questions?

To further discuss any of the changes that have been made to the calculation of Structural Soundness EBVs within the TransTasman Angus Cattle Evaluation, please contact Andrew Byrne, Angus Australia's Breed Development & Extension Manager, on (02) 6773 4618 or andrew@angusaustralia.com.au.

