Why Does This Sire have Different EBVs?

A question that commonly arises in Red Angus circles is “how can the EBVs of a sire differ when comparing their Red Angus and Angus Australia GROUP BREEDPLAN EBVs?” More specifically, some also ask “when compared on a percentile bands basis how can a sire rank differently for a trait across the two analyses (i.e. bottom 10% in one and top 20% in the other?”

The first and most important point to outline is that EBVs should **not** be compared across different breed society GROUP BREEDPLAN analyses. Generally speaking, each breed society is currently running a separate BREEDPLAN evaluation and subsequently, only EBVs for animals recorded within a particular breed society can be directly compared.

One of the reasons for this is that BREEDPLAN EBVs are expressed as the difference between an individual animal’s genetics and the genetic base to which the animal is compared. The “genetic base” is a historical genetic benchmark of that particular breed. For most breeds, their genetic base will have been set as the average genetic value of a group of calves born in the mid 1990’s. The genetic base for the Red Angus analysis is currently the average genetic value of the 2000 drop calves. Importantly, the genetic base for each breed will be different, so only EBVs for animals within a particular evaluation can be directly compared.

Putting this in practical terms, a 600 day weight EBV of +66 kg on a Red Angus sire from the Red Angus GROUP BREEDPLAN analysis is not equivalent to a 600 day weight EBV of +66 kg on a Red Angus bull from the Angus Australian GROUP BREEDPLAN analysis.

Looking at a more specific example, figure 1 and figure 2 illustrates an example of the EBVs, as graphed on a percentiles basis, for the same Red Angus sire that is pedigree recorded and has progeny recorded on both the Red Angus Society of Australia database and Angus Australia database. We will refer to this sire as sire Z.

**Fig 1. Sire Z – Red Angus GROUP EBVs Gr aphed on a Percentile Bands Basis.**
For some traits, this sire has similar percentile rankings across the two analyses. For example, top (higher) 10% Milk EBV, top 5% (fatter) for fat and IMF EBVs and bottom 5% (lower) for Retail Beef Yield EBV. Also this sire is above average in both analyses for the calving ease traits (shorter gestation length and lighter birth weight). However there are also some obvious contrasts particularly for the growth traits (e.g. 400 day weight), scrotal size and eye muscle area. So, why the differences?

The differences illustrated primarily result from the differences in performance information being analysed to produce the EBVs out of the two separate GROUP BREEDPLAN analyses. This includes:

1. **Pedigree**: While both databases have a significant depth of pedigree recorded for sire Z (+5 generations), the pedigree animals on the Red Angus database generally have lower accuracy EBVs. This indicates less performance information being analysed for relatives of sire Z in the Red Angus analysis.

2. **Own performance**: Sire Z does not have his own performance data included in the Red Angus analysis. In the Angus Australia analysis he has his own birth weight, 200 day weight, 400 day weight, scrotal size, fat scans, EMA scan and IMF scan included. Most importantly, his performance is also included in effective contemporary groups (i.e. large groups of contemporaries by more than one sire)

3. **Progeny performance**: In the Red Angus analysis sire Z has 24 progeny analysed across 5 herds with 6 being scanned for carcase traits and 3 of his daughters having calves with performance analysed. In the Angus Australia analysis sire Z has 51 progeny analysed across 3 herds with 26 being scanned for carcase traits and 2 of his daughters having calves with performance analysed. No progeny were dual recorded therefore each analysis has different calves being analysed in different contemporary groups with different levels of data recorded.
The different levels in performance data analysed within each analysis are displayed in the EBV accuracies (table 1.). There is generally more data being analysed for this sire in the Angus Australia analysis reflecting in higher accuracy EBVs. The Red Angus EBV are generally lower accuracy therefore have more potential to change (as does percentile ranking) as more data in analysed.

Table 1. EBV Accuracies of Sire Z from the Red Angus and Angus Australia GROUP BREEDPLAN analyses

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Birth Weight</th>
<th>200 Day Weight</th>
<th>400 Day Weight</th>
<th>Milk</th>
<th>Eye Muscle Area</th>
<th>Rump Fat</th>
<th>Intra-Muscular Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sire Z – Red Angus</td>
<td>69%</td>
<td>71%</td>
<td>71%</td>
<td>39%</td>
<td>35%</td>
<td>50%</td>
<td>44%</td>
</tr>
<tr>
<td>Sire Z – Angus Australia</td>
<td>93%</td>
<td>89%</td>
<td>88%</td>
<td>66%</td>
<td>70%</td>
<td>78%</td>
<td>68%</td>
</tr>
</tbody>
</table>

In summary, the differences observed in the Red Angus and Angus Australia EBV percentile ranking for sire Z are due to different performance data being analysed for pedigree animals (i.e relatives), own performance and progeny performance.

We should also not assume that while genetically similar in the broad sense that a sire from the Angus Australia analysis would rank the same on an EBV percentile basis in the Red Angus analysis, even if the same performance data was analysed and all other factors being equal. Perhaps a breed average Angus Australia sire for 400 weight EBV is below breed average within the Red Angus population and vice versa. This is just a hypothetical, and the only real way of knowing how the two populations line up on a genetic level is to undertake a joint GROUP BREEDPLAN analysis by merging the pedigree and performance datasets of the Red Angus Society of Australia and Angus Australia. The joint analysis would also produce one set on EBVs for each animal based of all data and avoid the confusion of having Z sets of EBVs available on the same animal as illustrated with sire Z.

So, which set of EBVs do you use in selection? If an animal happens to have two sets of EBVs, as does sire Z, the recommendation is to use the set of EBVs from the population that you do your selecting. That is, if you are a Red Angus seedstock breeder or commercial breeder that purchases Red Angus bulls with Red Angus GROUP BREEDPLAN EBVs then systematically use the Red Angus GROUP BREEDPLAN EBVs.

Further information on BREEDPLAN and genetic technologies in general can be accessed at the Southern Beef Technology Services (SBTS) website (http://sbts.une.edu.au) or by contacting Christian Duff, Red Angus SBTS Technical Officer Ph: (02) 6773 2472 or Email: christian.duff@une.edu.au

*Article written by Christian Duff for inclusion in the June 2011 Red Angus Express.*