



Multibreed EBVs

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This Agriculture Note covers understanding Multibreed Estimated Breeding Values (EBVs) and their use as a tool when selecting cattle.

What are Multibreed EBVs?

Estimated Breeding Values (EBVs) of animals from different breeds can't be directly compared. Different breeds have different BREEDPLAN bases and breed averages. An adjustment table is now available, enabling producers to calculate **multi-breed EBVs = directly comparable EBVs** for six traits for four breeds.

Table 1. Multibreed EBV adjustment table (March 2003)

	Gest. length	Birth Wt	200D Wt	400D Wt	600D Wt	Carcase Wt
Angus	0	0	0	0	0	0
Poll/Hereford	1.1	2.8	9	21	16	8
Limousin	9.2	6.4	13	25	17	20
Simmental	6.4	8.7	31	63	71	n/a*

* n/a = insufficient data at present

The figures in the Multibreed EBV adjustment table (Table 1) are not EBVs. They are the adjustments we add to each breed's EBVs to put them on the same base, equivalent to Angus.

Further research is underway to add more traits and breeds.

Using the Multibreed EBV adjustment table

Table 2 shows an example of Multibreed EBV calculations for two bulls. To compare an Angus bull with an Angus birth weight EBV and a Simmental bull with a Simmental birth weight EBV, we add 0 adjustment to the Angus EBV and 8.7 adjustment to the Simmental EBV to produce directly comparable multi-breed EBVs.

Table 2. Multibreed birth weight EBV calculation example

	Within breed EBV	Adjustment factor	Multi-breed EBV
Angus bull	+ 7.6	0	+ 7.6
Yakka			
Simmental bull	-3.1	+ 8.7	+ 5.6
Yardstick			

- Yakka's Multibreed EBV is Angus Birth Weight EBV of 7.6 + adjustment of 0 (from Table 1) = 7.6.
- Yardstick's Multibreed EBV is Simmental Birth Weight EBV of -3.1 + adjustment of 8.7 (from Table 1) = +5.6
- Only half of the genes come from the sire so the expected difference in average progeny birth weight is $\frac{1}{2} (7.6 - 5.6) = \frac{1}{2}$ of 2 = 1 kg
- Yakka's progeny are expected to average 1 kg heavier than Yardstick's progeny at birth.

Table 3 shows Multibreed EBVs calculated by adding the adjustment factors from Table 1 to within breed BREEDPLAN breed average EBVs for 2003 born animals.

Table 3. Conversion of breed average EBVs for 2003 born animals to Multibreed EBVs

Breed	Gestation Length EBV			Birth Weight EBV			400 Day Weight EBV			Carcase Weight EBV		
	Breed Avg	Adj factor	Multi-breed	Breed Avg	Adj factor	Multi-breed	Breed Avg	Adj factor	Multi-breed	Breed Avg	Adj factor or	Multi-breed
Angus	-1.6	+0	-1.6	+4.1	+0	+4.1	+56	+0	+56	+37	+0	+37
Poll/Hereford	0.0	+1.1	+1.1	+4.1	+2.8	+6.9	+34	+21	+55	+28	+8	+36
Limousin	-0.4	+9.2	+8.8	+1.3	+6.4	+7.7	+20	+25	+45	+17	+20	+37
Simmental	-0.2	+6.4	+6.2	+1.7	+8.7	+10.4	+23	+63	+85	n/a	n/a	n/a

Calculating the equivalent within breed EBVs for a bull from another breed

Another way of using the adjustment table is to find the equivalent within breed EBVs for a bull in another breed.

For example, if you've used Angus bulls with an Angus birth weight EBV of about 5.0 with no calving trouble you could use the adjustment table to calculate what the equivalent birth weight EBV would be if you were to purchase a Hereford bull.

This time you need to take OFF the adjustment. An Angus bull with an Angus birth weight EBV of 5.0 would be expected to sire calves with the same birth weight as a Hereford bull with a Hereford birth weight EBV of 2.2 (5.0 – the adjustment factor of 2.8).

Some cautions when using Multibreed EBVs**Do you need to consider hybrid vigour too?**

An additional consideration when using Multibreed EBVs to compare expected progeny performance for two bulls of different breeds is that the progeny performance is also dependent on the cow breed used. There could be different amounts of hybrid vigour in the different crosses.

The greater the genetic difference between the bull breed and cow breed the greater the hybrid vigour in the progeny will be. For example, if we use the Multibreed EBVs from 2 bulls, a Limousin and a Simmental, both to be joined to an unrelated third breed (eg. Hereford) hybrid vigour is expected to be similar. Therefore the Multibreed EBVs should predict the difference in the progeny reasonably well.

However, if the cow breed is Limousin then the Limousin sired progeny would exhibit no hybrid vigour but the Simmental sired progeny would. Therefore, in this case hybrid vigour of the Simmental-Limousin progeny would also need to be factored in.

The accuracies of Multibreed EBVs are lower

The accuracies of Multibreed EBVs are lower than the accuracies of the within breed EBVs they are calculated from. We are estimating the adjustment to an Estimated Breeding Value. Because the adjustments in Table 1 are estimates they may change with additional breed comparison data or as the breeds continue genetic change at varying rates.

Multibreed EBVs- the future

Current Beef Cooperative Research Centre (CRC) work will assist to bring in more breeds and traits.

At Department of Primary Industries Hamilton, data is being gathered to calculate adjustment factors to provide Multibreed EBVs for maternal traits: fertility, calving ease and milk. Similar work is happening at Struan Research Centre, SA.

Charolais, Shorthorn and Limousin bulls are being joined to F1 females from the original Multibreed EBV project used to calculate the adjustments for the six traits in Table 1. In a CRC project at Cooba Station in South West New South Wales Hereford cows have been joined to Charolais, Limousin and Angus bulls.

Another source of data will be from the Durham research herd near Orange. Angus females are being run with the main Shorthorn herd.

The Multibreed EBV adjustment table in this Agnote is an initial step towards the development of a comprehensive set of Multibreed EBVs.

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