Guide to Using BREEDPLAN Information in Animal Selection

The breeding animals which a beef producer selects for the herd will have a large impact on the profitability of the herd, both now and in the future. Profitability of the herd will be influenced by the number of calves (fertility), the weight of the calves (growth) and the quality of the calves (carcase), less the cost of production. All of these factors contributing to profitability are influenced to some degree by genetics, and thus can be selected for.

The breeding animals which a beef producer selects for the herd will impact upon the genetic progress (or lack therefore) that the indivudal herd makes over time. Bulls in particular have a large impact on the genetic direction of the herd, as they tend to produce more offspring than an individual cow (with the possible exception of cows flushed for ET). In herds where daughters are retained for breeding purposes, the impact of an individual bull in a breeding program can span generations, as his daughters continue to pass on his genetics to their own offspring.

Beef producers should view the selection and purchase of an indivdual breeding animal as a long term investment, which will have lasting impacts on both the profitability and genetic progress of the herd. Therefore, it is important that beef producers spend time on both the bulls and cows they are considering purchasing, and select the most profitable animals for their particular production system.

BEST PRACTICE GUIDE TO ANIMAL SELECTION

There are a number of things which BREEDPLAN recommends beef producers consider when deciding which animals to purchase, or which animals to retain within the herd.

These are:

1. Identify the selection index of most relevance to you
2. Rank animals on selection index
3. Consider individual EBVs
4. Consider other information

1. Identify the selection index of most relevance to You

Most breed socieities have developed selection indexes using the BreedObject software. The selection indexes currently available for Australian breed socieities are shown in Table 1. Each selection index has been developed for a specific production to market scenario. Some selection indexes are maternal (self-replacing), meaning that females are retained for breeding and therefore emphasis has been placed on fertility traits such as Days to Calving. Other selection indexes are terminal, meaning that all calves are sent to slaughter. In terminal selection indexes, there is no emphasis on fertility traits.

A full explanation of each selection index is available in the breed specific selection index tipsheet, available in the technical section of the BREEDPLAN website. These tipsheets include a description of each selection index, the profit drivers underlying each selection index (blue graph), the EBV Weightings for each selection index (red graph), and the predicted response for each trait if a beef producer was to select sires in the top 10% for the relevant selection index only (green graph).

When considering which selection index is of most relevance to the beef operation, beef producers should pay close attention to the green graph provided in the selection index Tipsheets. This green graph allows the beef producer to identify which direction each of the BREEDPLAN traits will move if they were to select sires in the top 10% of the breed for the particular selection index. Beef producers can then assess whether using a particular selection index will assist them to move their herd in the direction they wish to go.

For example, in Figure 1, the predicted responses for the Charolais Domestic Index are shown. As can be seen from Figure 1, selecting the top 10% of sires using the Charolais Domestic Index would drive an increase in both Calving Ease Direct and Calving Ease Daugthers, while decreasing Birth Weight and Gestation Length. 200, 400 and 600 Day Weights would increase, while Mature Cow Weight would decrease slightly. Milk and Scrotal Size would both increase. Carcase Weight, Rib Fat, Rump Fat and IMF would also increase, while Eye Muscle Area and Retail Beef Yield would both decrease.

Table 1. Selection indexes currently available for Australian breed societies.

| BREED	No. of Indexes	INDEX			
Angus	4	Angus Breeding	Domestic	Heavy Grain	Heavy Grass
Brahman	2	Jap Ox	Live Export		
Brangus	2	Domestic Steer	Export Steer		
Belmont	2	Domestic Steer	Export Steer		
Charolais	3	Domestic	Export	Northern Terminal	
Hereford	4	Supermarket	Grass Fed Steer	Grain Fed Steer	EU
Limousin	4	Vealer (Terminal)	Domestic (Terminal)	Steer (Terminal)	Self Replacing
Murray Grey	3	Long Fed Export	Supermarket	Heavy Grass Fed	
Red Angus	3	Supermarket	Vealer	Northern Steer	
Santa Gertrudis	2	Domestic Production	Export Production		
Shorthorn	3	Domestic Maternal	Export Maternal	Northern Maternal	
Simmental	4	Domestic Maternal	Export Maternal	Northern Terminal	Vealer Terminal
South Devon	2	Vealer	Supermarket	Export Maternal	
Wagyu	1	Fullblood Terminal			
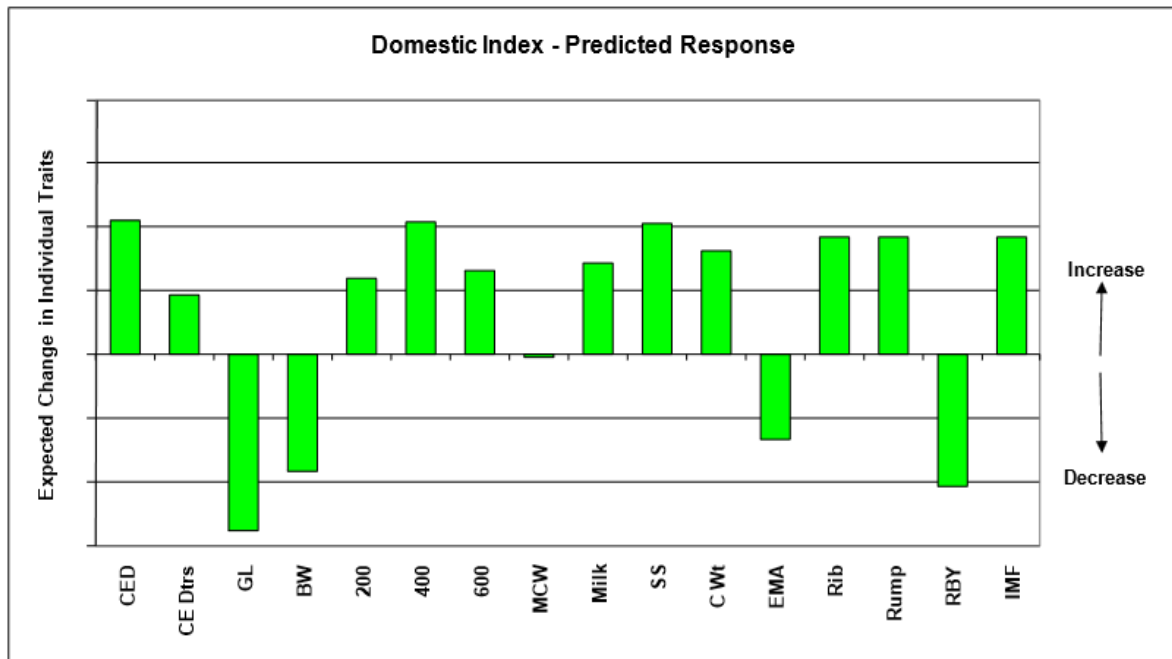
Figure 1. The predicted response on each individual trait of selecting bulls in the top 10% of the breed for the Charolais Domestic Index.

If none of the selection indexes developed by your breed society are relevant to your situation, it is possible to create your own customised selection index using the BreedObject software. For more information on how to develop your own customised selection index, visit the Breed Object website: http://www.breedobject.com/

2. Rank animals on selection index

Once a beef producer has decided which selection index is the most relevant to their situation, animals being considered for purchase should be ranked on selection index. This can be done using the online 'EBV Enquiry' function in Internet Solutions (for participating breed societies). Animals can also be ranked by selection index within an individual sale catalogue on Internet Solutions.

3. Consider individual EBVs

Once animals have been ranked on the selection index of relevance, it is important to consider individual EBVs for specific traits of interest. This is because a selection index is a weighted index, with multiple EBVs contributing to the final selection index value. Therefore, animals which

have the same selection index can have very different EBVs for an individual trait.

An example of this is seen in Table 2, where five animals have a selection index value of $140. While the selection index value is the same, these five animals have very different EBVs for a number of individual traits. For example, Bull 1 has a Calving Ease Direct EBV of +6.7 %, while Bull 5 has a Calving Ease Direct EBV of -1.0 %. The birth weights of these five bulls also varies, with Bull 1 having a Birth Weight EBV of +2.5 kg and Bull 2 having a Birth Weight EBV of +5.6 kg. The individual EBVs also differ for several of the carcase traits, with Bull 4 has a EMA EBV of +3.5 cm^2 and Bull 2 has an EMA EBV of +6.2 cm^2.

In addition, some traits, such as docility, are not currently included in the selection index. To address this, BREEDPLAN recommends that beef producers rank animals on the relevant selection index as a first step. In the second step, individual EBVs for traits of importance should be considered to ensure that they fit with the breeding objectives of the beef producer. For example, a beef producer may rank animals on the selection index, and then do a secondary

Table 2. The individual EBVs for 5 bulls, all of which have a selection index value of $140.

Bull	Calving Ease DIR (%)	Calving Ease DTRS (%)	Gestation Length (days)	Birth Weight (kg)	200 Day Weight (kg)	400 Day Weight (kg)	600 Day Weight (kg)	Mature Cow Weight (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Weight (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Docility	Index ($)
1	6.7	7.5	-4.7	2.5	40	67	95	75	21	3.4	-5.7	67	3.9	0.2	-0.1	1.3	0.9	-2	$140
2	-0.6	2.3	-1.1	5.6	44	72	115	86	18	2.6	-2.5	77	6.2	0.4	0.0	2.0	1.7	-	$140
3	4.4	4.4	-0.6	2.6	37	63	95	63	20	3.6	-4.2	69	4.9	1.3	1.5	0.5	2.0	-	$140
4	2.3	3.2	-0.5	4.3	44	77	118	99	19	3.1	-2.4	78	3.5	0.6	0.3	0.6	1.7	-	$140
5	-1.0	2.6	-1.3	4.3	43	76	115	99	17	3.3	-4.9	86	5.5	0.6	0.1	1.6	0.8	13	$140

selection by removing any animals which are below breed average for docility.

4. Consider other information

There is often a range of other information available on sale bulls. This information can include the following:

- Pedigree
- Bull Breeding Soundness Examination (BBSE) results
- Structural soundness
- DNA test results for genetic conditions

BREEDPLAN recommends that when beef producers are making selection decisions, they also consider the other information available on the animal before making a final selection decision. Analysing the pedigree of an animal allows beef producers to make an assessment of how closely related the particular animal is to their herd. This allows beef producers to avoid excessive levels of inbreeding within their herd.

The Bull Breeding Soundness Examination provides an objective measurement of a bull's

fertility. Similarly, a visual appraisal of the bull allows beef producers to assess whether the bull is structurally sound. After all, a bull might have EBVs which are in the top 1% of the breed for all traits, but unless he is fertile and structurally sound, and thus successfully able to serve cows and produce calves, then his EBVs are irrelevant.

Lastly, BREEDPLAN recommends that any DNA test results are considered. These could include DNA test results for horned/polled status, or DNA test results for any genetic conditions which are prevelant in the particular breed.

Buying a bull is a long term investment, and will have a lasting impact on the profitability and genetic progress of the herd. Therefore it is important that beef producers spend the time to ensure they make the best selection decision for their breeding objectives.

For further information regarding interpreting BREEDPLAN EBVs and selection indexes, and how to use these to rank and select animals, please contact staff at Southern Beef Technology Services (SBTS) or Tropical Beef Technology Services (TBTS).