Profit Based Selection Using Charolais Selection Indexes

The spring bull sale season is just about upon us and it is important to understand and appreciate the genetic selection information that will be provided on many Charolais bulls this season. A very powerful selection tool for commercial and seedstock producers alike are the Charolais Selection Indexes.

A Selection Index is effectively a single unit value predicting a breeding animal’s profitability for a defined commercial production system and market end-point. They are based on weightings on specific EBV traits deemed important for that production system. Ranking animals on their Selection Index value sorts them based on their progeny’s expected profitability for the targeted production system.

As a guide to using Selection Indexes, it is recommended that producers, both seedstock and commercial, undertake the following steps:

(i) Identify the Selection Index of most relevance
(ii) Rank animals on the Selection Index
(iii) Consider the individual EBVs of importance
(iv) Consider other traits and information of importance

1. Identify the Selection Index

As mentioned above, a Selection Index value for an animal is effectively a single unit value predicting an animal’s profitability for a defined commercial production system and market end-point. Consequently, before using Selection Indexes, producers should identify the index that is of most relevance to their particular production system. For seedstock producers, this may be the production system of their bull buying clients. In order to identify the most relevant Selection Index for use, it is recommended that producers consider the description of each Selection Index available. Following are the descriptions for the 3 Charolais Selection Indexes:

**Domestic Index (DOM)** - Estimates the genetic differences between animals in net profitability per cow joined for an example commercial herd with a British cow base (e.g. Angus) targeting grass-finished production for the domestic trade. This Index assumes pasture grown & finished steers weighing 430 kg (240 kg HSCW and 6 mm P8 fat depth) at 12 months. Daughters are retained or sold for breeding therefore maternal traits are of importance. In response to industry feedback positive emphasis has been placed on finishing ability.

**Export Index (EXP)** - Estimates the genetic differences between animals in net profitability per cow joined for an example commercial herd with a British cow base (e.g. Angus) targeting the production of steers for export markets. This Index assumes pasture grown & finished steers weighing 700 kg (380 kg HSCW and 9 mm P8 fat depth) at 29 months. Daughters are retained or sold for breeding therefore maternal traits are of importance. In response to industry feedback positive emphasis has been placed on finishing ability.
**Northern Terminal Index (NT)** - Estimates the genetic differences between animals in net profitability per cow joined for an example commercial herd in Northern Australia (e.g. Brahman cows) targeting the production of grass finished steers for the Jap Ox market. Steers are sold direct to slaughter at 630 kg (345 kg HSCW and 5 mm P8 fat depth) at 28 months. All progeny are slaughtered. In response to industry feedback positive emphasis has been placed on finishing ability.

Selection Indexes are developed for the commercial sector, as indicated by the descriptions above, therefore it should be relatively simple for a commercial producer to select one of the available Selection Indexes to use in their selection decisions. This is a slightly more complex task for seedstock producers as they are generally providing bulls to a range of commercial producers who are in a range of production systems and supplying a range of market end points. In this situation we recommend that Charolais seedstock producers use the Selection Index that suits the majority of their commercial clients and recognize that the Charolais Selection Indexes are highly correlated, therefore selecting on one (e.g. EXP) will also generally lead to a positive trend for the others (e.g DOM).

2. Rank Animals on Selection Index

Once the Selection Index of most relevance has been identified, the animals available for selection can then be ranked on that particular Selection Index. An example of this is in figure 1, where the accredited Charolais AI Sires list has been ranked in descending order on the Charolais Domestic Selection Index using the Charolais online EBV Enquiry facility. This could be just as easily applied to all 2009 born male calves recorded with the Charolais Society of Australia or a specific on-line bull sale catalogue.

![Figure 1. Charolais AI Sires Ranked in Descending Order on the Charolais Domestic Index. Nb the EBVs highlighted in blue indicate that the sire is a ‘Trait Leader’ for the specific trait.](image-url)

When ranking animals on the Selection Index, producers should also take into account the following points:
• Selection Indexes cannot be used to compare animals across breeds. As with EBVs, the Selection Indexes for animals of different breeds are calculated within different BREEDPLAN evaluations. Consequently, Selection Indexes can only be used to compare animals with other animals of the same breed.

• Producers can use Selection Indexes to see where an animal ranks compared to other animals of the same breed by comparing its Selection Index value to the current breed average value and to the percentile table.

Comparing an animal with the current breed average Selection Index will give you an indication of how the animal compares with the current genetic level for the breed in terms of profitability for that particular production system and market scenario. The current breed average values are located on the last row in figure 1. If we consider the Domestic Index value of Rangan Park Rio Bravo D15 of +$53 and compare it to the breed average value, it indicates that this animal is expected to have genetics that are more profitable than the current genetic level of the breed if the animal is used within this production scenario.

Comparison of an animal’s Selection Index value to the breed average can be taken a step further by looking at the Percentile Bands table to determine exactly where the animal ranks within the breeds. If we consider the animal in the above example with the Domestic Index value of +$53, the Percentile Table below indicates that the animal is in fact ranked within the top 1% of the breed for that particular production scenario and market endpoint (see circled information in figure 2.)

As with the breed average EBVs and Indexes, a Percentile Table should be enclosed in all BREEDPLAN reports, sale catalogues etc. They are also accessible from the BREEDPLAN website (http://breedplan.une.edu.au).

3. Consider Individual EBVs of Importance

While Selection Indexes combine all the available EBV information to provide an indication of an animal’s overall genetic merit, it may still be important to pay attention to the animal’s individual EBVs for traits of particular importance.

For example, you may have eye muscle area (EMA) and it relationship to Retail Beef Yield (RBY) in your selection objective but feel that while the Selection Indexes are providing...
benefits in other traits they are not emphasizing the muscling traits enough. If so, you should also be considering the animals EMA and RBY EBVs.

In order to consider the animal’s individual EBVs, it is recommended that producers set maximum/minimum EBV ranges for the individual traits of particular importance. Animals should firstly be ranked on the Selection Index of relevance but then any animals whose individual EBVs fall outside of the acceptable range be excluded from selection. For example, we have again ranked the Charolais AI sires (figure 1) in descending order on the Charolais Domestic Selection Index but have also applied minimum EMA EBV criteria of breed average.

Figure 3. Charolais AI Sires Ranked in Descending Order on the Charolais Domestic Index and Breed Average or Above for EMA EBV. Nb the EBVs highlighted in blue indicate that the sire is a ‘Trait Leader’ for the specific trait.

4. Consider Other Traits and Information of Importance

While Selection Indexes take into account all the available performance information on an animal, they do not consider all the traits of functional and economic importance. Consequently, Selection Indexes should be used in association with assessment for other traits of importance that may not be accounted for in the Index (eg. structural soundness, temperament) and Bull Breeding Soundness Evaluation information. This will provide the best possibility of the bull you select getting his share of cows in calf and maximizing the input of his high value (Index) genetics in your herd.

You can access further information on the Charolais Selection Indexes from the Charolais SBTS Technical Officer, Christian Duff (ph: 02 6773 2472 or email: christian@sbts.une.edu.au) or on the BREEDPLAN website (http://breedplan.une.edu.au).

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