

Shorthorn \$Indexes

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Standard Shorthorn \$Indexes

There are four standard \$Indexes.

- **Domestic Supermarket \$Index**
- **Domestic Restaurant \$Index**
- **Export Maternal \$Index**
- **SB3 Carcase \$Index**

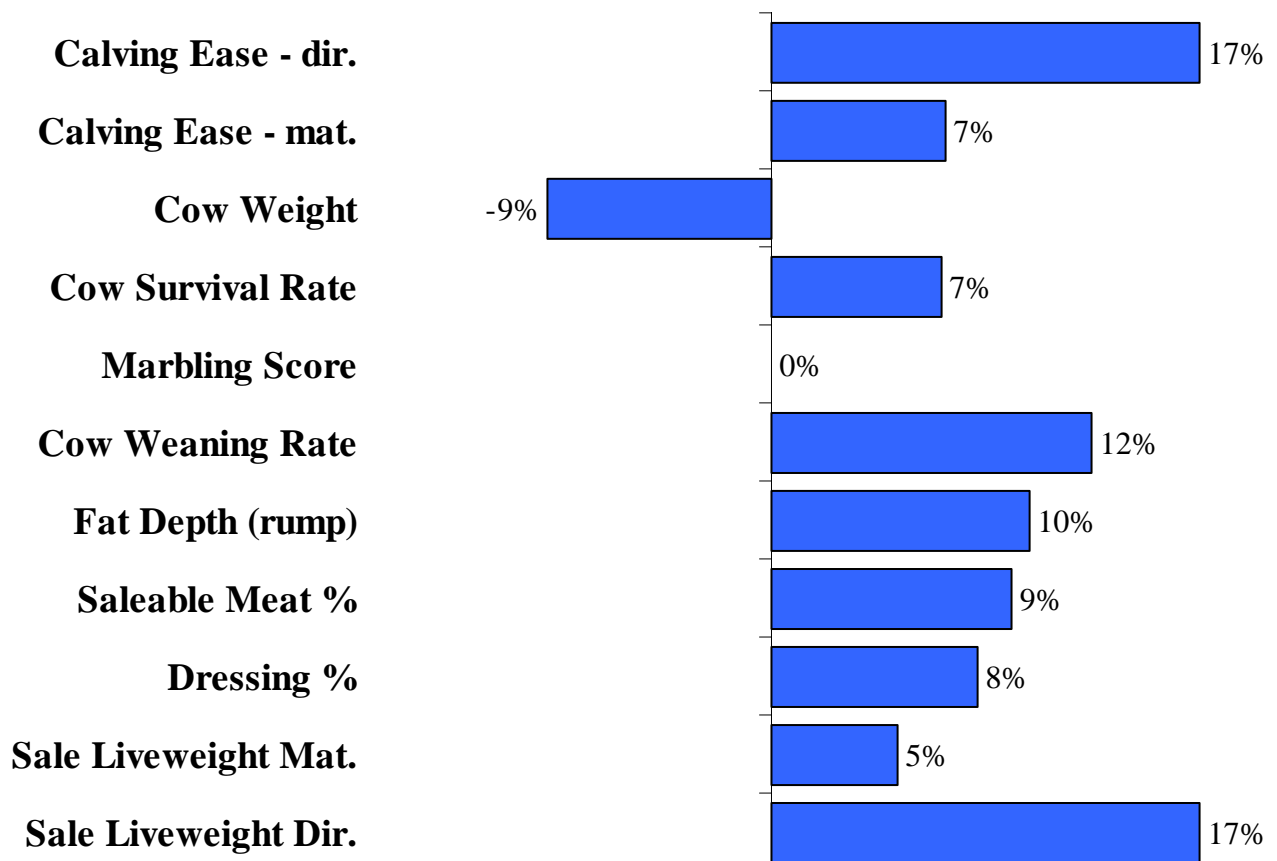
The indexes were derived using the BreedObject technology (see description below).

All four \$Indexes assume that a proportion of heifers bred within the herd will be retained for breeding. The benefits and costs considered include both those for the sale animal from birth to slaughter and those for the cow herd.

NB: For both the Domestic Supermarket and Export Maternal indexes more emphasis is placed on calving ease in the objective. For both the Domestic Restaurant and SB3 Carcase indexes less emphasis is placed on calving ease in the objective.

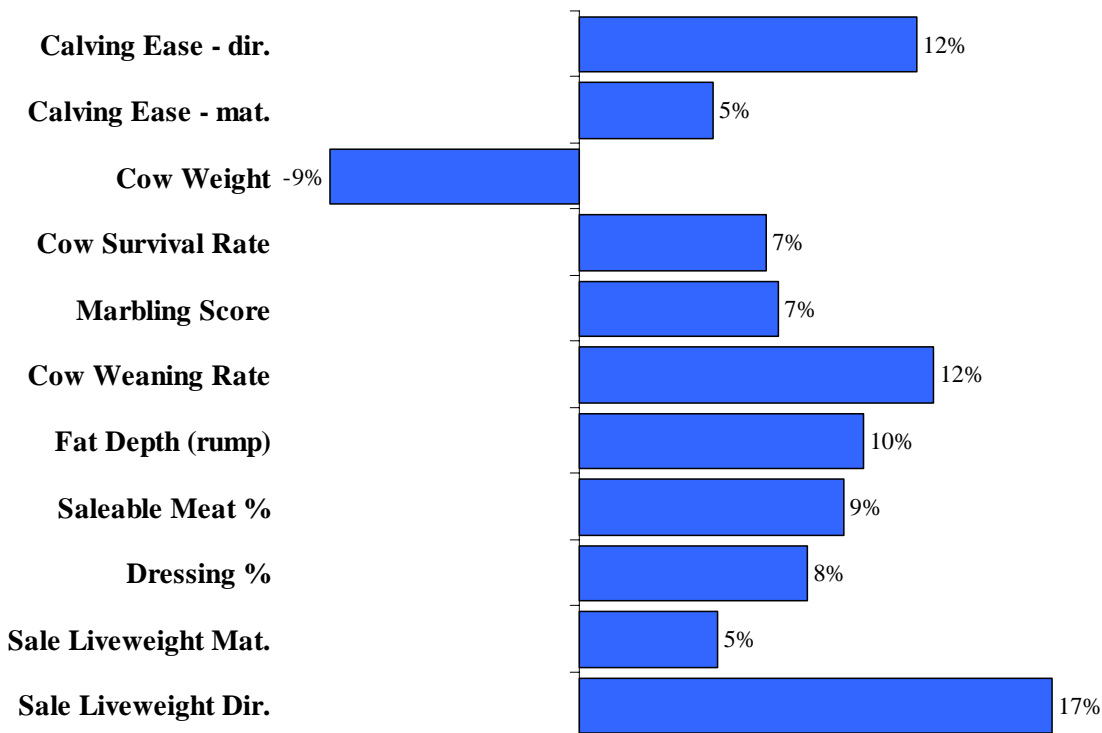
A brief description of the production market system represented is given below:

- **Domestic Supermarket \$Index** : Pasture grown & finished steers, 475kg at 17 months, for Supermarket trade; from a self-replacing herd run in a temperate environment. The relative importance of the various elements (traits) for each of the standard indexes can be seen in Graph1.



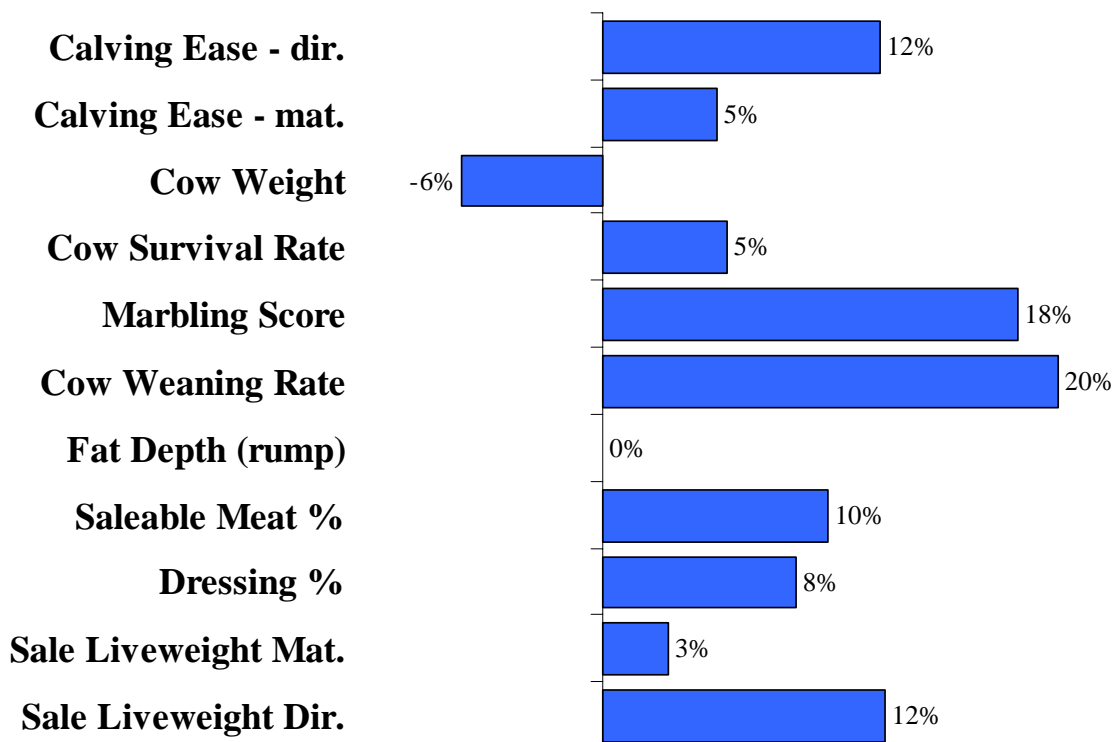
Graph 1: Trait emphasis for the Domestic Supermarket \$Index - Slaughter weight 475 kg LWt at 17 month, pasture fed – moderate concern for calving ease

- **Domestic Restaurant \$Index:** Pasture grown & finished steers, 475kg at 17 months, for Supermarket trade; from a self-replacing herd run in a temperate environment. This is a variation on the Domestic Supermarket with lower emphasis on calving ease and a moderate emphasis on marbling to assist meeting MSA grading – more suitable for mature cows or very easy calving herds. If selecting sires for use on heifers using this index, a suitable cut-off on birth weight or calving ease should be used to screen for suitable candidates. The relative importance of the various elements (traits) for each of the standard indexes can be seen in Graph 2.



Graph 2: Trait emphasis for the Domestic Restaurant \$Index - Slaughter weight 475 kg LWt at 17 months, pasture fed – lower concern for calving ease

- **Export Maternal \$Index** : Pasture grown to approximately 400 kg live weight; 220d long-fed steers, carcass weight 650kg at 25m, for Japanese B3 market; from a self-replacing herd run in a temperate environment. The relative importance of traits is shown in Graph 3.



Graph 3: Trait emphasis for the Shorthorn Export Maternal \$Index – Slaughter weight 650 kg LWt at 25 months after 220 days on feed – moderate concern for calving ease

Shorthorn SB3 Carcass \$Index

Introduction

The development of this \$Index is in response to requests to select bulls that will produce steers that meet the requirements of the feedlot and processing industry for the mid-fed Japanese export market.

Considered in isolation these requirements ignore many important considerations for breeding, especially those associated with female performance.

This \$Index concentrates on economic parameters for the production of mid-fed Japanese export market steers.

For bull selection other \$Indexes such as the Export Maternal \$Index that value all aspects of performance, especially maternal traits, should also be considered.

Further, as this is the first \$Index of this kind considered for release to industry Shorthorn Beef will monitor closely its use and may need to modify the \$Index as deemed necessary.

Description of the \$Index

Input data is based on information received on pricing policies of AMH. Interpretation of this information is as follows.

- A base value is set then premiums and discounts applied as follows:

- For carcasses above average weight gain there is a premium for growth rate of 80¢ if they marble score 0-1 and a premium of \$1 per kg above average gain if they marble 2 or better.
- For every 1 mm above 10mm at the P8 site there is a penalty of \$5.00 per carcass – reportedly this is to estimate yield effects – this is a pseudo measure of retail beef yield.
- There is a \$17 per carcass premium for an additional 1% dressing.
- Marbling commands a stepwise premium with a 40¢ discount per kg HSCW for anything less than optimum marble score 2 and 20¢ premium for each marble score above 2.

To value only the steers in the \$Index, the following is the interpretation of the above information into the questions of the BreedObject questionnaire:

- No surplus cows are sold.
- There is no calving difficulty factored into the calculations as the feedlot buyers aren't interested – they only pay for the live ones.
- Steers are fed for 220 days and slaughtered around 27 months of age.
- To avoid contribution from fertility of daughters it is treated as a terminal case ie. all progeny are sold to slaughter – in fact heifers are valued at the same rate as steers and heifer growth rates and dressing percentages are the same as steers.
- Feedlot entry weight is 450 kg.
- Feedlot ration is valued at \$260 per tonne.
- Weight gain on feed is 1.2kg /day resulting in a carcass weight of 417 kg.
- Base Carcass value @ \$3.65 /kg DWt
- Marbling premium used is 80¢ for increase in marble score from 1 to 2 and 40¢ for every marble score after that. Heifers are treated as steers and therefore have the same premium. The reason for doubling the premium suggested above is to cater for the apparent extra emphasis which is included in growth rate premium where those above average gain but marble score 2 or better get another 20¢ premium.

A difference between BreedObject economic calculations and the feedlot's valuation is the cost of feed. The feedlot has no way of measuring the individual feed intake so it ignores this at the individual animal level. They do however measure pen intakes and calculate feed conversion. It is therefore important at the genetic level to consider feed costs to improve the average feed conversion.

Results using the 'W' export steers from the Durham project and their sires demonstrate that this \$Index describes reasonably well the genetics (sire lines) that perform under this assessment system. The following graph shows the fit of sire average carcass value against their \$Index values using the above described \$Index. It is a clear demonstration of the ability of the \$Index technology to reflect industry data.

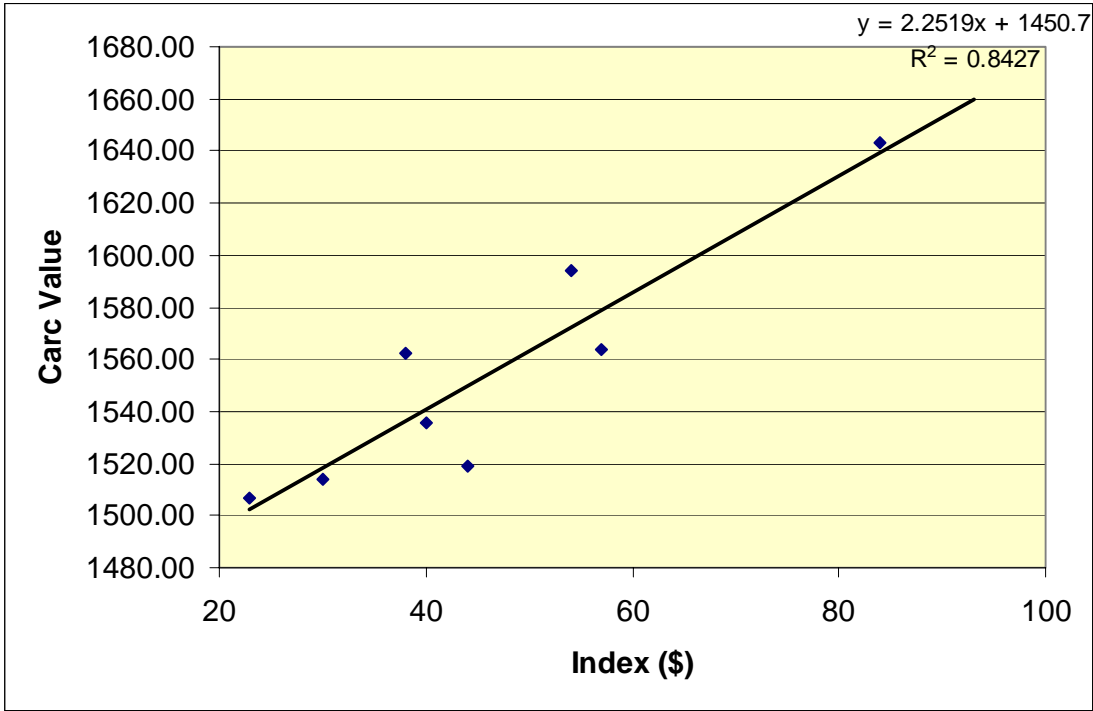


Fig1: Average carcass value for sire progeny groups vs \$Index value of sires (only sires that had most of their data from this group)

Using the above inputs the \$Index has emphasis on the key performance traits that are as shown in the following graph.

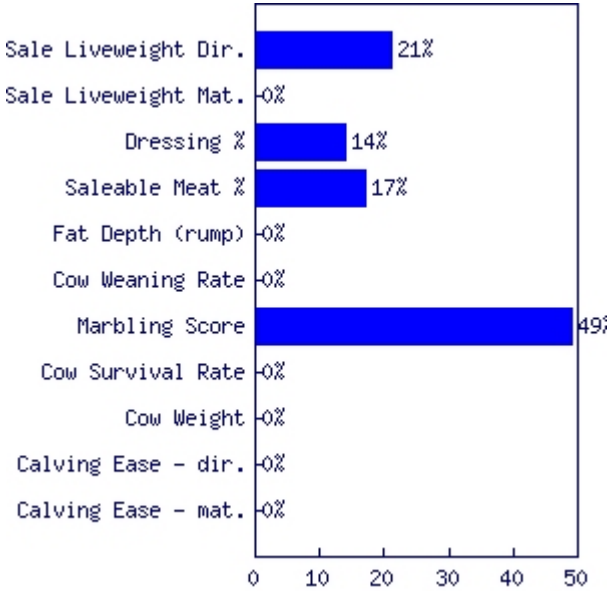


Fig 2: Economic emphasis on key economic traits for the Shorthorn SB3 Carcass \$Index

This transposes to weighting on the EBVs as shown in fig 3

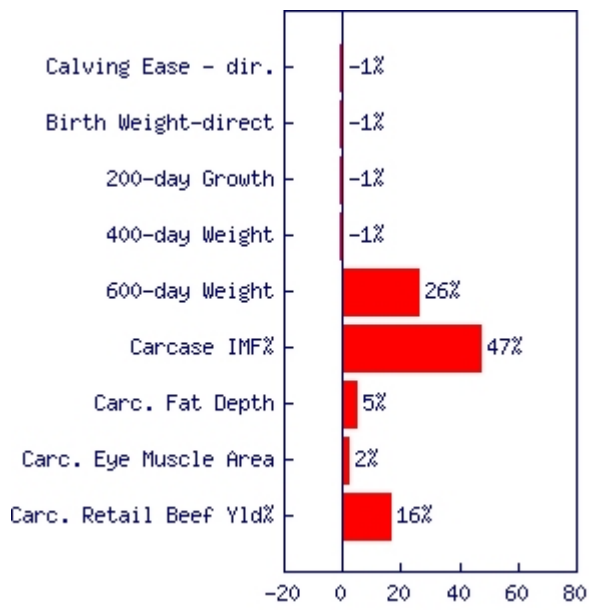


Figure 3: Importance of EBVs in Shorthorn SB3 Carcase \$Index

NB: For both the Domestic Supermarket and Export B3 indexes more emphasis is placed on calving ease in the objective. For both the Domestic Restaurant and Export B3M indexes less emphasis is placed on calving ease in the objective.

Understanding Shorthorn Selection Indexes

Breeders have been discussing improvement of Shorthorn cattle by selection for a couple of centuries but with few exceptions breeding has followed fashion rather than a structured genetic improvement program. The essential ingredient for genetic improvement is a clear definition of goals or objectives and accurate assessment of the elements (traits) involved in profit.

BREEDPLAN has provided the system for making valid genetic comparisons between animals on many of the economically important traits and now BreedObject is available to relate BREEDPLAN EBVs to an objective where the basic objective is to increase profit.

Profitability in the beef cattle industry is a function of numerous traits and some of these traits have antagonistic relationships to each other. To improve profitability, selection must be applied to those traits that contribute most to profit (costs and returns) of an enterprise. If a trait has no economic value then it should not be included in the selection program. BREEDOBJECT, via a questionnaire, collects production and economic information then analyses that information to decide which traits are of most economic importance. The relative importance is expressed as economic values. As a result of the economic analysis, BREEDOBJECT defines the breeding objective for the chosen market/production system and formulates the best selection index using the available EBVs.

How do Selection Indexes work?

BreedObject first performs a trait-level analysis of what affects profit in the commercial herd for your target production purposes. Shorthorn standard indexes have been calculated for four standard cases using industry averages. These standard indexes represent two of the major target markets for Shorthorn cattle with two levels of concern about calving ease. The two markets are the long fed export and the grass fed domestic markets. There is a further variation in the index named 'Domestic MSA' in that it includes some emphasis on marbling to assist in meeting MSA requirements.

The analysis is done using details for a typical enterprise that would have a turn-off of cattle with the given specifications. The important elements of information include weight, age, carcass specifications, grass or grain fed, whether the herd is spring or autumn calving, an estimate of the current levels of calving difficulty, weaning percentages and the price you have been receiving for your sale animals.

The results of this analysis determine what the improvement of different traits is worth in a commercial herd. BreedObject then uses this information to assess what the emphases should be on different BREEDPLAN EBVs. Finally the program calculates a \$Index value for each animal that reflects these different trait emphases.

The \$Index calculated is an EBV for profit for performance in the commercial beef supply chain – in other words, it describes to what degree each animal is expected to benefit profitability of beef production. The terms 'beef production' and 'beef supply chain' are used here because the profit defined is for all players in the chain from the cow-calf operator to the feedlot and processor. The higher the \$Index, the greater potential profit.

Ranking Shorthorn bulls on their \$Index sorts them for their progeny's expected profitability for the chosen commercial production purpose. The quantum leap necessary to understand the logic is that the

value of a Shorthorn bull (or indeed any seed stock) is based on the value of its genes in a commercial production system, from the commercial breeding herd to the value of the carcase.

BreedObject selects animals whose cumulative value of the individual EBVs sum to an overall profitable animal. This is true balanced breeding where the value of each individual EBV is given its correct economic weighting. If bulls are ranked using a Shorthorn \$Index it indicates the predicted value of a bull's progeny relative to the progeny of other Shorthorn bulls listed.

BreedObject is for use by both bull breeders and bull buyers, and it can be used in the following ways:

- **to rank animals (sires and dams) for selection in seed stock herds.**
- **to rank sale bulls from seed stock herds for different purposes, as a service to clients.**
- **for use by bull buyers to rank available sale bulls.**
- **to help select potential AI sires.**
- **to assess trait importance for different production environments and markets.**
- **to manage genetic trade-offs (eg. growth v calving ease, meat yield % v marbling, growth v mature cow size, fertility v carcass).**
- **for use by breed societies and/or breeders to identify potentially elite young sires for further testing.**