$INDEX VALUES FOR EXAMPLE CASE STUDIES

In an ideal situation it would be desirable to select animals for breeding that excel in all traits. But, in reality it is always necessary to make some compromises in balancing the strengths and weaknesses among the animals available for selection. With the large number of EBVs to be taken into account in any selection decision it is often difficult to decide what relative emphasis that you should apply to each trait. For example, if you are targeting the Japanese B3 market how much emphasis should you place on growth EBVs compared to IMF% EBVs?

These problems can be largely overcome through the use of a selection index. This is a procedure for combining individual EBVs into a single "overall" value. The EBVs are combined on the basis of their relative economic importance for a particular situation and the scope for genetic change of each trait. The poultry and pork industries have made substantial use of selection indexes for many years. To a lesser extent the dairy and wool industries have also used selection indexes. Beef producers can now also use this technology to assist in the establishment of balanced breeding objectives and in the ranking of animals for selection.

A software program called BREEDOBJECT[1] has been developed to assist in the design of customised breeding objectives for beef producers in different environments targeting different markets. The program calculates $Index Values which provide an overall ranking of animals on the balance of their Group Breedplan EBVs to suit a particular breeding objective.

Individual EBVs can be used to predict differences between animals in the likely progeny performance for particular traits. In a similar way, $Index Values can be used to predict differences in the net profit resulting from the use of one bull over another. For example, if we compare a sire with a $Index Value of +$60 to another sire with a $Index Value of +$30 for the same breeding objective, the first sire has the potential to produce an additional _ x ($60 - $30) = $15 per cow joined (progeny receive only half of the $Index Value differences between the sires, as half of their genes come from their dams). If the sire was joined to a total of 200 cows during his herd life, then we would predict that the superior sire has the potential to generate an additional (200 x $ 15.00) = $3,000 more revenue than the inferior sire.

$Index Values have been calculated for several example case studies, described below. In each example it was assumed that market prices and production costs were typical values for a beef enterprise operating in 2001. It was also assumed that the beef enterprise obtains benefits from improved carcase performance (eg. via retained ownership to slaughter) in addition to improved herd productivity.

In addition, for each example it was assumed that feed was a limiting resource for a large part of the year and any increase in herd feed requirements has a cost. In the self-replacing herd cases an average calving rate of 85% was assumed, with a moderate concern for calving difficulty.

Case 1. Japanese B3 Index

Suitable for an example self-replacing commercial herd in temperate Australia targeting the production of steers for the long-fed export markets that value marbling (eg. Japanese B3 market).

The relative emphasis on each economic trait for the example Japanese B3 Index is shown in Figure 1.

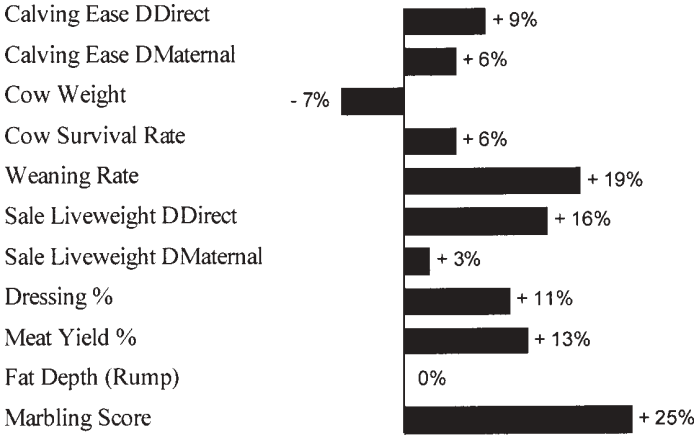

Figure 1. Percentage emphasis on each economic trait in the example Japanese B3 Index.

Case 2. CAAB$_{TM}$ Index

Suitable for an example self-replacing commercial herd in temperate Australia targeting the production of steers for the Certified Australian Angus Beef$_{TM}$ program.

The relative emphasis on each economic trait for the example CAAB$_{TM}$ Index is shown in Figure 2.

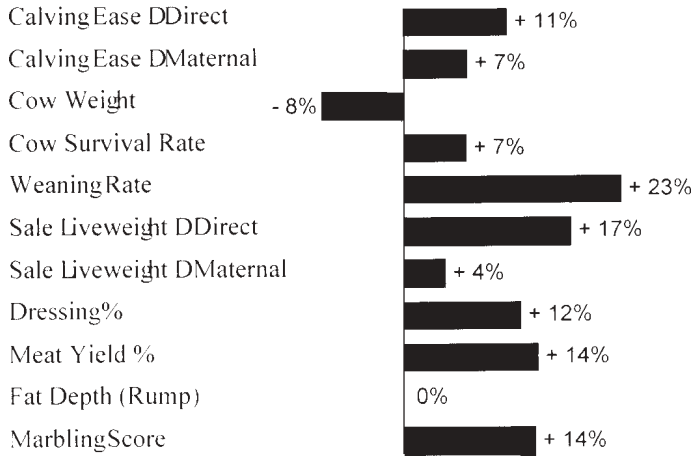

Figure 2. Percentage emphasis on each economic trait in the example CAAB$_{TM}$ Index.

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[1]BREEDOBJECT was developed by the Animal Genetics and Breeding Unit (AGBU), a joint institute of NSW Agriculture and The University of New England. Ongoing research and development at AGBU is supported by funding provided by Meat and Livestock Australia. The assistance of Dr S. Barwick in the development of the example case study indexes is gratefully acknowledged.

Case 3. Domestic Supermarket Index
Suitable for an example self-replacing commercial herd in temperate Australia targeting grass-finished production for the domestic supermarket trade with no marbling requirement. The relative emphasis on each economic trait for the example Domestic Supermarket Index is shown in Figure 3.

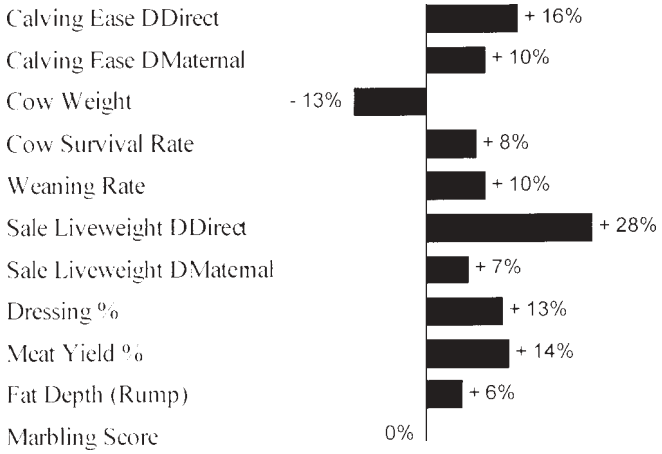

Figure 3. Percentage emphasis on each economic trait in the example Domestic Supermarket Index.

Case 4. Northern Terminal Index
Suitable for an example commercial crossbred herd in northern Australia using Angus sires over tropically adapted cows to produce terminal progeny to be grain fed for the Japanese B2 market. The relative emphasis on each economic trait for the example Northern Terminal Index is shown in Figure 4.

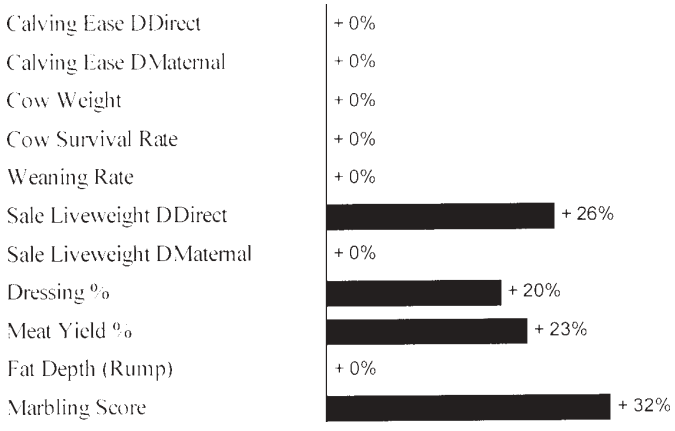

Figure 4. Percentage emphasis on each economic trait in the example Northern Terminal Index.

$Index Percentile Values
When using $Index Values to assist in selection of animals it is often useful to consider the figures relative to the values for other animals in the Angus population.

The percentile table for $Index Values for all 2001 born calves (shown below) is a useful guide to the relative ranking of any animal compared with the total 2001 calf crop.

Selection Indices

Japan B3 Index	CAAB Index	Super market Index	Northern Terminal Index
$96	$72	$61	$62
$84	$64	$56	$56
$78	$60	$53	$53
$73	$57	$50	$51
$70	$55	$49	$49
$67	$53	$47	$47
$64	$51	$46	$46
$62	$49	$45	$44
$59	$47	$43	$43
$57	$46	$42	$42
$55	**$44**	**$41**	**$40**
$53	$43	$40	$39
$50	$41	$39	$38
$48	$39	$38	$37
$46	$38	$37	$35
$43	$36	$35	$34
$40	$34	$34	$32
$37	$31	$32	$31
$34	$28	$30	$28
$29	$24	$27	$25
$19	$17	$20	$19

For example, an animal with a CAAB $Index Value of +$50 is in the highest 25% of the breed for the example CAAB selection index (i.e. relative to all 2001 born calves). Similarly, an animal with a Domestic Supermarket $Index Value of +$22 is the lowest 5% of the breed for the example Domestic Supermarket index.

Develop your own selection index
BREEDOBJECT can be used to establish customised selection indexes for particular situations. A questionnaire needs to be completed to provide information on production costs, performance levels and market targets. This information is used to derive the relative economic values of different traits, and the index weighting factors to be applied to the EBVs for potential candidate animals for selection. The Angus Society has staff trained in the use of BREEDOBJECT software. For more information contact Peter Parnell on 02 67723011.