



Economically Relevant Traits

“What are they and why do we need them?”

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In today's farming environment, where maximising profitability is generally the most important farming objective, there should be no place for using animal traits in a breeding programme, which don't improve profitability. Economically Relevant Traits (ERTs) are those traits, which directly affect farm profitability.

When changes are made to an existing system, we always need to return to the reasons why the system was originally put in place, so we don't lose sight of those initial goals.

Performance recording was introduced to identify **genetically** superior/inferior animals (in traits that are of **economic** importance) so that they could be selected/culled, thereby improving the genetic potential and profitability of the herd. The two most important words in this sentence are **genetically** and **economic**, because if genetic evaluation of performance recorded information fails to **identify** and **quantify** the **genetic** portion of the difference in performance that exists between individuals, then it is highly unlikely genetic progress will be made. Also, if the traits that are being recorded are not of **economic** importance, then improved profitability that should result from making genetic progress is not likely to occur.

The technology involved in genetic evaluation is becoming more sophisticated, as geneticists develop techniques for more accurately identifying and separating the genetic and environmental components of the difference in performance between individuals. In the beginning, farmers compared animals using raw performance information (raw data), but soon realised this did not present a 'level playing field'. Adjusted raw data was then introduced to 'level up the playing field' eg. adjustments were made for date of birth, age of dam etc. This approach gave way to Beefplan, a within herd system which used ratios, with 100 representing the average of the group, to compare animals. It did not provide a prediction of an animal's genetic potential. Under this scheme, animals could not be compared unless they were run together in a group under the same environmental conditions. The next step was the introduction of EBVs (estimates of genetic potential) and technology (BLUP), which enabled environmental differences affecting groups of animals within and between farms and countries to be removed. This then leaves the difference in performance resulting from the activities of the animal's genes, which is what breeders are interested in, because animals pass their genes on to their progeny **not** the affects of the environment.

Today the field data from all major beef breed societies in N.Z. is subject to a BLUP analysis, resulting in the production of 17 different EBVs. While each of these EBVs is an estimate of the genetic potential of an animal for a particular trait, none of them relate to the **feed costs of production** and most are only an **indirect measure of the returns** (indicator traits). As stated earlier, assuming profitability is a major farming objective, **genetic improvement must directly increase farm profitability**, otherwise we're all wasting our time.

With so many EBVs available nowadays, bull buyers (unless they have developed goals and breeding objectives or use the MeatNZ Sire Selector) become totally confused during the selection process, because they are not sure which traits to target or how to place them in order of financial importance. This often results in the

wrong type of bull being purchased for the particular class of land and production system. In addition, bull buyers who are selecting animals using an ERT (e.g. Calving Ease) together with one of its indicator traits (e.g. Birthweight), are reducing the effectiveness of their selection decision by this 'double counting'.

In the development of ERTs, most of the indicator traits that are currently available are used along with some additional information. For example, one ERT that is currently available is **Direct Calving Ease**. This combines 3 indicator traits, namely **Birthweight**, **Gestation Length** and a **Calving Ease Score**. Calving ease has a direct affect upon \$ returns, because it influences the number of dead cows and calves at calving time. Another ERT is **Cow Maintenance Feed Requirement**. This combines the currently used indicator traits **Mature Cow Weight** and **Milk Production** with two new traits **Cow Condition Score** and **Gut Weight** and relates to one of the major costs in a breeding cow operation. Currently there are **no** EBVs which deal with **feed costs of production** at all.

Once the appropriate ERTs are developed, the next step is to combine these, along with their relative \$ values [**Economic Weightings (EW)**] into a single figure or **Index**. This Index describes the estimated impact a particular animal will have on farm profitability. For example, if two bulls, one with an **Index of 50** and the other **0**, are randomly mated to a group of cows, the first bull will return **\$25(\$50/2)** more per cow mated than the second. An Index may be calculated in the following way:

$$\text{Index (in \$s)} = \text{Calving Ease EBV} \times \text{its EW} + \text{Heifer Pregnancy EBV} \times \text{its EW} + \\ \text{Length of Productive Life EBV} \times \text{its EW} + \text{Sale Weight EBV} \times \text{its EW} \\ \text{minus Cow Maintenance Feed Requirement EBV} \times \text{its EW}$$

This is the same system used by the dairy industry. Its **Breeding Worth Index** combines EBVs for five ERTs namely **Milk, Fat, Protein, Liveweight Gain** and **Longevity**

Bull buyers will differ in the amount of emphasis they place on each trait. This will be influenced by things such as the class of land they are farming on, their selling policy and their particular production system.

The MeatNZ Sire Selector, which can be found on the Internet at www.meatnz.co.nz or www.beef.org.nz, provides potential bull buyers with options, enabling them to customize bull purchases in the manner described above. From November this year, the Charolais Breed Society will be the first breed society to include ERTs in the MeatNZ Sire Selector programme

In Summary

- The whole point of performance recording is to improve the genetic potential of animals and ultimately their profitability.
- Currently there are a large and increasing number of EBVs available, most of which only indirectly influence farm profitability.
- There is an urgent need :
 - 1) To reduce the number of EBVs presented to bull buyers to make the genetic component of the selection process more user friendly.
 - 2) For the EBVs made available to buyers, to more directly reflect the economic performance of animals.
 - 3) To address the impact growthrate and mature weight have on feed costs.
 - 4) To simplify the selection process by catering for differing breeding objectives (customization), and the incorporation of these into one figure (an Index) which would describe the impact a particular animal would have on profitability.

Customized ERTs, combined with their economic weightings and brought together into an Index (as seen in the new version of the MeatNZ Sire Selector) will go a long way to achieving all the above.