



Management Tools

Breed Values

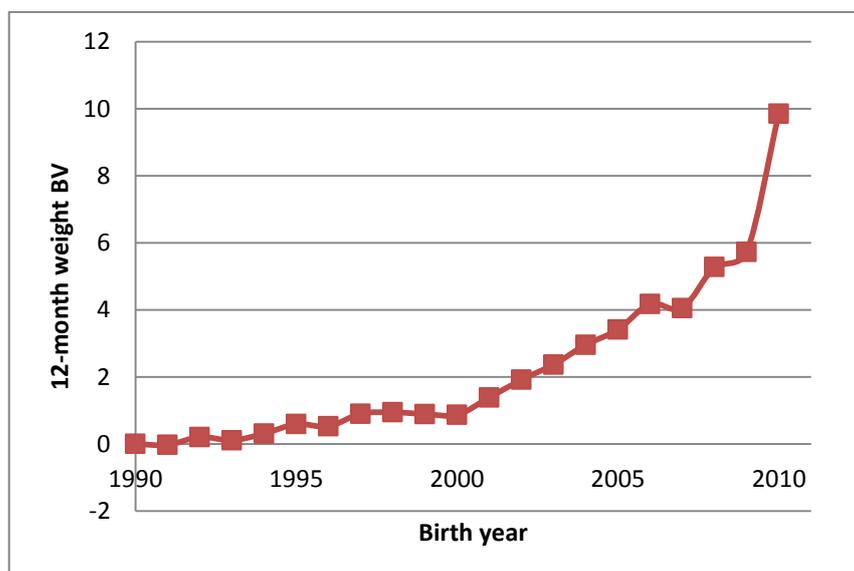
Jason Archer, AgResearch Ltd

Breeding values are a tool used in most livestock industries to assist in making selection decisions, and their impact on making genetic progress is well proven. Breeding values give an estimate of the genetic superiority of individual animals which is more accurate than assessment of the animal's own appearance or measured performance alone. In essence Breeding Values make predictions based on:

- 1) Adjusting for the systematic differences that occur between animals due to factors such as:
 - i. management group (this includes feeding, but also other factors which might affect the performance of a whole group including water supply, etc).
 - ii. Sex of calf
 - iii. Age of dam (2 year old hinds have lower productivity than other age groups).
- 2) Adjusting performance records for how heritable the trait is (some traits have a larger relative contribution of genetics in determining performance than others) and for the available performance information on relatives (e.g. information on the performance of sire, dam, half-brothers and sisters, and progeny if available adds information to predicting breeding values over and above the performance of the individual alone).

The breeding value prediction system for the deer industry in New Zealand is called DEERSelect. It operates on an internet-based system to allow breeders from all over the country to contribute data to an industry database which is used to calculate breeding values. For breeding values for growth traits this data is pooled across the country when calculating breeding values, so that the breeding values on animals in any one herd can be compared to those in other herds across the industry. This allows us much more scope when selecting the sires which we use to breed stags, and results in much faster genetic progress. The outcomes can be seen in the graph below (Figure 1) which plots the average eBVs of animals born across New Zealand over the last 20 years, and the marked improvement coinciding with the start of eBV usage in the early 2000's, and also an increased emphasis by breeders on venison traits, is evident.

Figure 1. Genetic progress in 12-month weight Breeding Value across all DEERSelect herds over the last 20 years.



The Breeding Values (eBV's) for growth traditionally reported are for weight at 12 months of age and mature weight. As of October 2011 carcass eBV's such as carcass lean yield (kg) (that Wilkins Farming are presenting), were also made available on DEERSelect. Carcass lean eBV represents the kg of lean meat yield on a 12 month animal. Growth and carcass eBV's are reported in kilograms and are relative to the average animal born in 1995 and recorded on the DEERSelect database. In other words, a stag with a carcass lean eBV of +5.0 carries genes which would yield 5 kg extra meat as a yearling than the average recorded stag born in 1995 would yield. If you use this stag as a sire, his calves will then yield 2.5 kg more meat (on average) than a stag with an eBV of 0.0 used over a similar group of hinds. The difference is half of the difference of the stag's eBV's because the stag only contributes 50% of the calf's genetics – the other half coming from the hind. Of course if you use the stag over a group of hinds with similar genetic merit to the stag himself you will get calves with better genetics from both hind and stag and will achieve more gains in performance. The stag's genetics will also be passed to his daughters which if kept as replacements will be able to pass on their better genes to future calves. In this way, over time the average performance level of your herd will lift (providing the animals are fed to be able to achieve their genetic potential), and you will get a long-term permanent improvement in productivity from your investment in animal genetics.

Genetic trends from the Wilkins herd indicate that significant progress is being made in growth rates. Many stags in the 2011 sale have W12eBV's well above the average for their age group across New Zealand and performance of offspring from this year's offering of stags will continue to improve. Incorporating carcass eBV's such as carcass lean (Figure 3) this year, and in to the future should make similar genetic gain for those traits.

The graphs below (Figures 2 and 3) show the eBV's of the stags available in this catalogue. These simply plot individual animals by their breed type, which are compared to the average of the deer born in the same year (2009) and recorded on the DEERSelect database, given as a solid green line. This average includes a proportion of DEERSelect-recorded stags which are born in herds with a strong antler focus and relatively little emphasis on growth rate in their selection objectives. However, the graph still gives a picture of where the stags available in this sale sit relative to other stags born in the same year around New Zealand, and (within the same analysis) eBV's are comparable across other herds around New Zealand.

Figure 2. Breeding value for 12-month weight of sale stags plotted with average eBV of 2009 born stags across all DEERSelect herds.

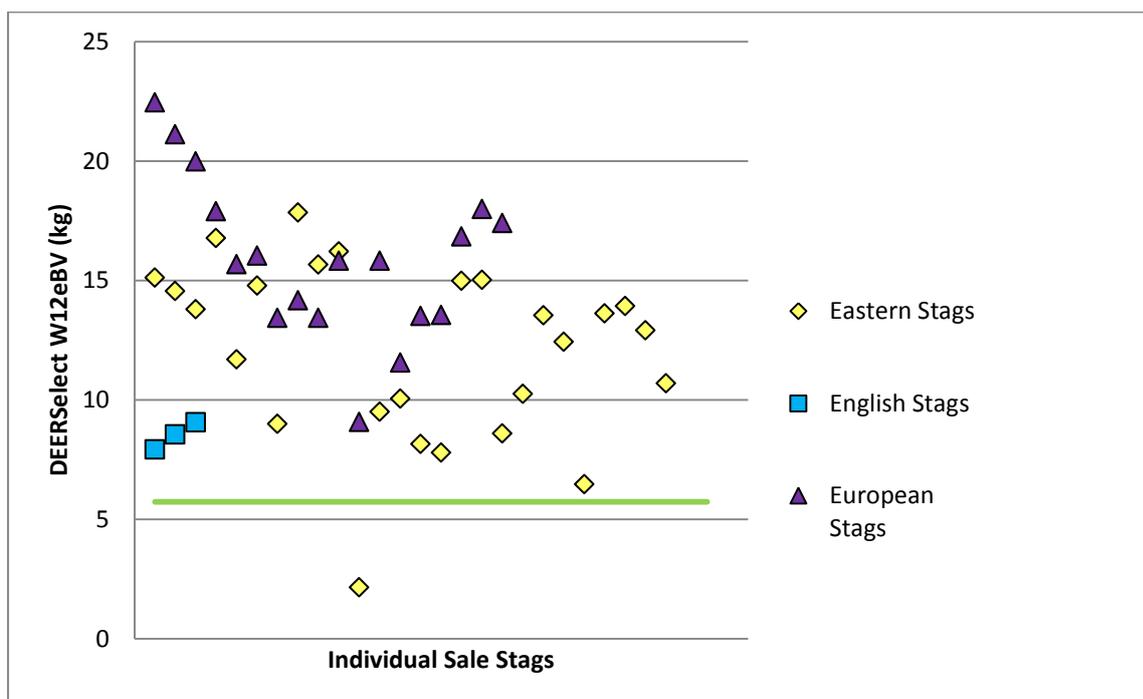


Figure 3. Breeding value for carcass lean at 12 months of age for sale stags plotted with average eBV of 2009 born stags across all DEERSelect herds.

