Working towards net zero carbon emissions

Beef bull selection

Practical Guide

Choosing a stock bull is an important decision. Many bulls are selected from an initial visual assessment taking into consideration conformation, feet, legs, locomotion, temperament and scrotal size and shape. The physical appearance of the animal (phenotype) is made up from genetics (genotype) and environmental factors e.g. how the animal was raised, nutrition and health management.

The environmental management might help the appearance of a bull, but this won't necessarily transfer to its offspring. This is where Estimated Breeding Values (EBVs) can help. These are sets of data which identify how the progeny of the bull should perform, and allow cattle from the same breed to be compared against each other, excluding any input from environmental factors. Often seen as complicated and unnecessary, using EBVs can be an extremely important management tool to help improve the productivity of the herd.

This practical guide looks at what you should consider when selecting a breeding bull for use within the beef herd

Estimated Breeding Values

EBVs are calculated data sets from actual measurements of bull performance from breeders and farmers. They are expressed as '+' or '-' in real values e.g. days, kg of live weight and mm of fat or muscle depth taken from progeny of the bull and genetically related sires.

There are two companies which provide EBVs in the UK - Signet/BASCO is operated by Edinburgh Genetic Evaluation Services (EGENES) and Breedplan (ABRI).

EBVs allow farmers to make breeding decisions based on what traits they need to improve within the herd e.g. increased daily liveweight gain; calving ease or carcase confirmation. It is important to note that EBVs are not comparable across different breeds, but that the figures allow comparison of genetic traits of bulls within a breed type.

Data sets from genetically related bulls are used within the calculations and allows for greater accuracy in the measurements. Accuracy of the traits is noted alongside the EBVs. Values less than 60% indicate that the data sets may change in the future as more information is gathered from breeders and genetically related animals. It is worth noting that some traits have not been recorded for as long as others, and for that reason the accuracy may be lower, e.g. maternal traits. These may have accuracy rates of 40-50% and is one of the reasons you rely on high accuracy rates (>60%) for growth and carcase traits.

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Interpreting EBVs

Often represented graphically, EBV indices can offer a quick way to check a bull's potential.

The indices use the figure of 100 as a reference point to be equal to the current breed average for each trait. The graphic then makes it easier to see at a glance how the bull performs compared to others within the breed - either above or below average. Some elite bulls can sit well above index 130.
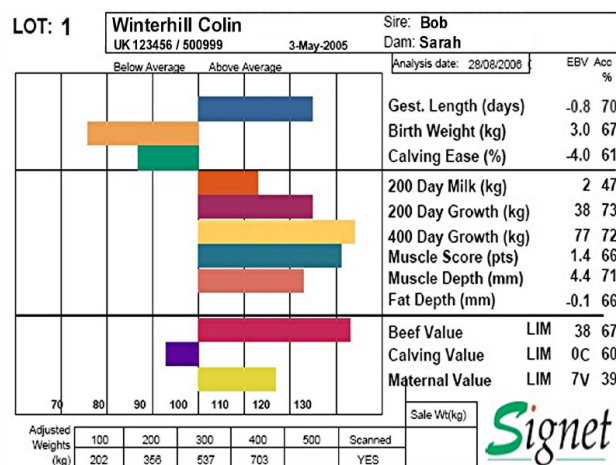
Looking at the EBV and accuracy figures gives you more insight. For the figure above, the EBV for birth weight shows that calves born from this bull will on average be 1.5kg heavier than calves born from a bull with an EBV of 0 for this trait. Note the EBV figures for the bull are halved to predict the performance in progeny - to account for only 50% of the genetics coming from the bull; the remaining 50% are maternal genetics.

The 200 day growth EBV shows that this bull's progeny will on average be 19kg heavier at weaning than a bull with an EBV of 0 for this trait.

The accuracy figures are listed beside the EBVs. For most of the traits in this example, the accuracy is >60% and can be considered reliable. However for the 200 day milk (kg) EBV the accuracy is 47%. This figure relates to the maternal influence on a calf's 200 day weight - i.e. potential milk production (subject to environmental factors), so in this example the bull is expected to produce heifer calves that will have characteristics leading to their calves being 1kg heavier at 200 days than a bull with an EBV of 0 for this trait. Because this figure hasn't been recorded for as long as the other EBVs, it requires the daughters of the bull to be bred and the data recorded over several years, meaning the accuracy is lower, so this figure needs the consideration of the other EBVs in order to base a decision. As more of the data is recorded from daughters, the accuracy of this EBV should increase.

EBV traits of importance

Gestation length (days)	- ve values = shorter pregnancy. This can relate to lighter birthweight calves which may translate to less calving difficulty
Calving ease - direct (%)	+ve values = reduced need for calving intervention
200 day growth (weaning)(kg) 400 day growth (kg)	+ve values= faster live weight growth rates - ve values= slower liver weight growth rates
Scrotal circumference (cm)	+ve values = sons will have larger testicles at 400 days and daughters should reach puberty earlier
Fat depth (mm)	- ve values = leaner carcases +ve values = deeper back fat
Muscle depth (mm)	+ve values = deeper loin muscle depth

Give your bull an MOT

At least two months before he is required to work, the bull should have a thorough MOT check. A body condition score of 3.0 is ideal for a bull prior to work; if identified in advance he can be fed accordingly to achieve this, avoiding heavy concentrate rations. Assess his feet and leg health, offering a foot trim to ensure his mobility isn't compromised.

Check his scrotum, looking at circumference measurement and the texture of his testes. His scrotal circumference should be in line with his breed and age. e.g. at least 32 cm at 18 months and 34 cm at 24 months. Testicles should be firm to touch without any lumps or cysts and reasonably even in size. Your local vet can offer a more thorough service, including checking the health of his sperm. Since sperm development takes around 60 days, the earlier any problems are identified, the better.

Bull : cow ratios

Knowing that it takes 60 days for sperm to develop, it is important not to overwork bulls.

Mature bulls should not be put to more than 50 cows. In larger herds, swap bulls at 21 days. Younger bulls should work between 25 - 30 cows. It is important to observe younger bulls to ensure they're big enough to successfully cover the cows.