## Estimated Breeding Values (EBVs)

The Pedigree and Performance data collected and stored on the Beefbreeder database is analysed using a procedure called BLUP (Best Linear Unbiased Predictor).

The BLUP system calculates how much of each animal's performance is due to it's breeding merit and how much is due to the environment in which it has been raised. This assessment of breeding potential is expressed in units known as Estimated Breeding Values, or EBVs.
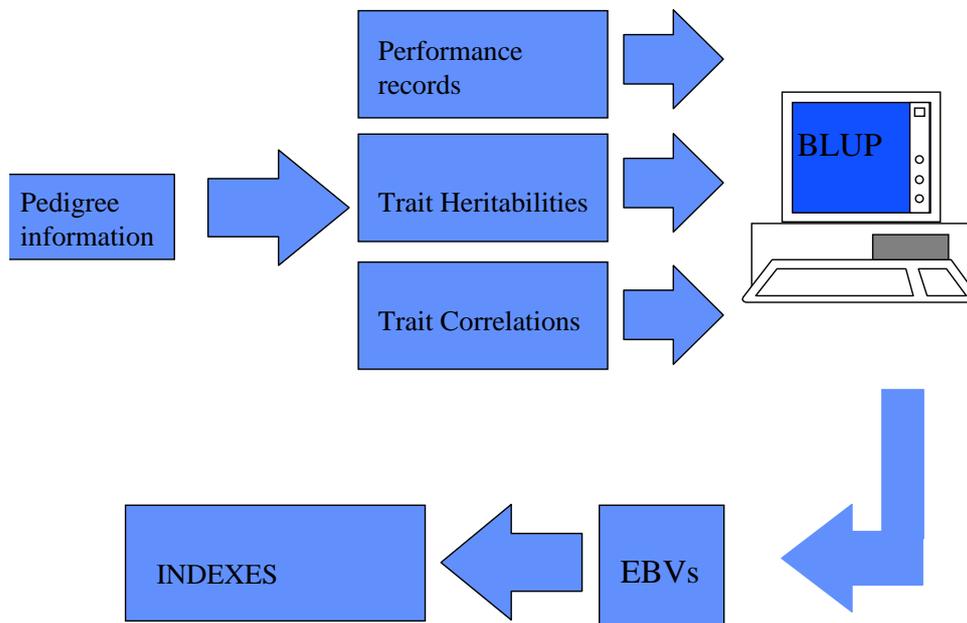
EBVs provide a measure of the breeding potential of an animal for a specific trait. They take into account performance data collected on known relatives, the relationships between performance traits (correlations) and the degree to which traits are inherited from one generation to the next (heritabilities).

EBVs are expressed in the same units as the recorded trait (e.g. kg for 200 day weight) and they relate to a common baseline. This baseline of zero relates to the average breeding value of cattle born in 1980.

EBVs are easy to interpret, for example:

> *A bull with an EBV of +40 for 400 day weight is estimated to have the genetic potential to be 20kg heavier at 400 days of age compared to a bull with an EBV of 0.*

A recorded bull will only pass on half of its genes to its calves so its EBVs must be halved in order to estimate the average genetic worth of its progeny.

Table 1. Standard Performance Traits

EBV	Interpretation	Notes
TERMINAL SIRE EBVs		
Birthweight (kg)	Negative Values = Lighter calves at birth	High birth weights are more likely to be associated with difficult calvings
Gestation Length (days)	Negative Values = Shorter gestations	Short gestation lengths result in easier calvings, because birthweights tend to be lower. A short gestation also increases the interval between calving and the start of mating, giving the cow more time to recover body condition.
Calving Ease (Direct) (%)	Positive Values = More unassisted calvings	Estimates the percentage of unassisted calvings that can be derived from a particular sire.
200-Day Growth (kg)	Positive Values = Faster growth rates	Selection for faster growth will result in animals that have heavier carcases at a constant fat class or leaner carcases at a constant age. Selection for high growth rates also tends to result in an overall increase in mature size (and therefore higher birthweights).
400-Day Growth (kg)	Positive Values = Faster growth rates	
Muscle Depth (mm)	Positive Values = Deeper loin Muscles	Selecting for these traits will increase the yield of lean meat in the carcase.
Backfat Depth (mm)	Negative Values = Leaner carcases	Indicates animals capable of producing lean carcases or, if required, can be taken to heavier carcase weights without becoming overfat.

MATERNAL EBVs		
Longevity (days)	Positive Values = Longer breeding life	Predicts the length of an animal's breeding life in the herd
Age at 1st Calving (days)	Negative Values = Puberty reached at an early age	Herds looking to calve heifers at two years of age should identify bulls with superior (negative) EBVs for this trait. This will increase conception rates at first mating.
Calving Interval (days)	Negative Values = Cows that get back in calf more quickly	This EBV can be used to breed cows with short calving intervals that get in calf again quickly
200-Day Milk (kg)	Positive Values = More productive female replacements	This EBV is the maternal component of 200Day Weight. It indicates how well a bull's heifer calves will perform when they become mothers and is greatly influenced by milking ability
Maternal Calving Ease (%)	Positive Values = More unassisted calvings	Identifies females that will calve more easily. Should not be confused with Calving Ease Direct (see above), which is an EBV predicting how easily born a bull's progeny will be.