



## ALPACA FACTSHEET EBVs

# Estimated Breeding Values

There are some basics to breed improvement that everyone can agree on (I hope!).

Any animal breeder, alpaca or otherwise, needs to know:

- what trait, or traits they are trying to improve
- the difference between good and bad in that trait
- how to identify the alpacas that have the “good” genes

There are two broad categories of traits. Those controlled by one or two genes e.g., eye colour, coat colour, and those controlled by multiple genes like mature body weight or fleece weight.

For the first group the effect of husbandry or environment on the outcome of breeding is non-existent. For example, the amount of food an alpaca eats will not affect eye colour. For the second group, husbandry and environment will have a significant effect on the outcome. Better fed alpacas have a thicker fibre micron measure and will have a bigger body weight. Because husbandry and environment vary between farms, the same genetics under different management will produce a slightly different outcome.

For the traits controlled by a single (or perhaps two or three genes) like eye colour or coat colour, you can get quite a long way towards improving your animals just by seeing what is in front of you and picking the animals with the traits you like to be the parents of the next generation. That said, coat colour in alpacas is controlled by 3 or 4 genes and is predictable, however you will benefit from genotype testing, because different combinations of genes can give you the same colour and they will not reproduce consistently.

For other traits, like fleece weight and fibre micron diameter, there are many genes involved in shaping the outcome that we see, as well as the effect of husbandry/ environment. For these traits identifying the best alpacas by “eye” is almost impossible which is where Estimated Breeding Values (EBVs) come in - to help work out which alpacas are genuinely superior.

The key things that EBVs do is separate out the effects of genetics and husbandry/ environment and present a number that only reflects the genetic potential of the alpaca for that trait. We know (from the data collected already) that in a trait such as fibre micron diameter 40% of what you see in a shorn fleece is down to the genetics of the alpaca and 60% is down to management.

One way of thinking about this, which explains what is going on is as follows. If you had a group of alpacas of the same age and sex but from different herds (and hence breeding, husbandry and environment) all with a measured micron averaging 20. The EBVs for fibre diameter might vary from -4 to +4 micron. So, although they all look the same you would want to pick the alpacas that carry genes for the finer fleece to be part of the breeding programme, namely those with an EBV of -4 rather than +4.

The data required to produce EBVs is easily gathered. The information on the pedigree registry plus the measure of the trait, say fibre micron diameter, and shearing dates is all that is needed. A powerful computer then compares the performance of all related animals and works out the effects

## ALPACA FACTSHEET EBVs

of husbandry and genetics. The more data we have from more alpacas the stronger and more accurate the analysis becomes. Repeated measures of the same alpaca as it get older add further strength to the analysis.

In the years that the BAS EBV programme has been running we have collected data from 50 different herds and, along with historic data, we have information on approaching 10,000 alpacas. Data is collected and collated through the summer and early autumn with a calculation of EBVs for the contributing herds in November each year. Data is released back to owners in December after checks have been done.

EBVs are currently calculated for fibre diameter, Stand Deviation (SD) of fibre diameter, comfort factor, spin fineness, staple length, curvature, and fleece weight.

### Summary of EBV solutions for fibre traits for animals in the datafile

Trait	Minimum EBV	Maximum EBV	Mean EBV	MEAN measure
Fibre Diameter (FD) micron	-4.25	6.86	-0.14	21.8
SD FD micron	-1.07	1.75	-0.03	4.6
Comfort Factor %	-26.34	28.94	0.05	90.4
Spin Fineness	-7.42	6.74	-0.36	21.5
Staple Length (mm)	-12.87	12.15	1.74	99.1
Fibre Curvature Dg/mm	-25.39	35.41	-3.26	33.8
Fleece Wt (kg)	-0.46	0.85	0.06	2.1

Herd managers use the data to make suitable matings. It is worth saying that EBVs are a tool that help breeding decisions and are obviously not the entire story. You still need healthy sound alpacas of good conformation but EBVs will help you identify alpacas with the fleece genetics need to make breed improvement. If you only use the best alpacas to be parents of the next generation fleece quality will improve. EBVs will also identify poor animals that should be excluded from the breeding programme.

Sometime in the future, when contributing herds are comfortable with the idea, the full results could be included in the registry for all members to peruse. In other species when this happens the



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data helps buyers and seller value alpacas and help everyone pursue their breeding goals with more confidence.

As data accumulates a new trait of persistence of fineness should be produced which will identify those alpacas that keep a fine fleece as they grow older. Repeat measures of the same alpacas as they age is a key to achieving this aim.

The good news are that EBVs really do work and the traits we are interested in are highly heritable. By using EBVs within two or three generations noticeable progress can, and will, be made. If you are interested in being part of the EBV programme, then contact Duncan using [ceo@bas-uk.com](mailto:ceo@bas-uk.com).