



Books, Book Reviews, Extracts

Document ID:	SheepCRC_32_14
Title:	2010 Sheep Focus – Genetic Technologies
Author:	Sheep CRC, Sam Gill
Key words:	sheep; genetics; genetic technologies;

Sheep CRC Update seminars held in eight locations across Australia between February and May 2010 provided a valuable summary of progress achieved by the Sheep CRC and our Participants in our first three years of operation. The Sheep CRC publication '2010 Sheep Focus' captures key messages and results presented in the seminars in a form that provides an easy reference document. It should be cited as:

Sheep CRC/Sam Gill – *2010 Sheep Focus – Genetic technologies*



SHEEP CRC

GENETIC TECHNOLOGIES

Delivering permanent, cumulative gains



Photo: Sheep Genetics

Sam Gill
Manager, Sheep Genetics

Genetic improvement is permanent, cumulative, and cost-effective, with Australian Sheep Breeding Values (ASBVs) being an important and effective tool to make genetic gain.



Photo: Deb Maxwell

ABOVE: Look for ram sale pen cards with ASBVs

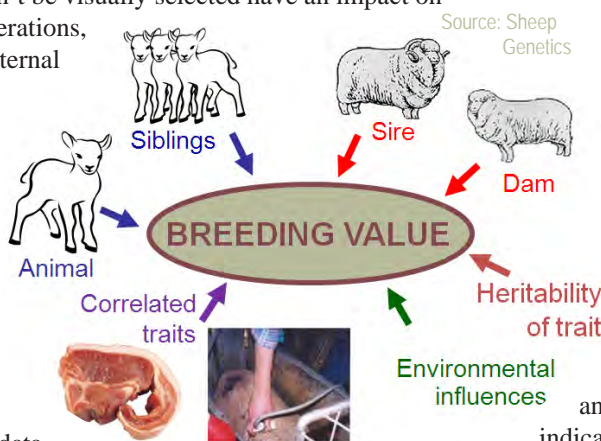
LEFT: ASBVs take into account many factors

ASBVs enable genetic selection for economically important traits in each sheep type including:

- Terminal sires: growth, fat, eye muscle depth, birth weight, lambing ease, and worm resistance.
- Maternal sires: fertility, maternal capacity, growth rate, wool traits, carcase value, and worm resistance.
- Merino sires: wool quality and quantity, growth, fertility, worm resistance, carcase traits, and breech strike resistance.

Also, ASBVs for traits that can't be visually selected have an impact on the performance of future generations, such as reproductive rates, maternal performance, lamb survival, staple strength, and internal parasite resistance.

Selection should be based on the genes the animal has, not on nutrition and other non-genetic factors; ASBVs enable an estimate to be made of the value of the genes carried. They are more accurate than using raw data or visual assessments because they take into account not only how an animal itself performs, but also genetic parameters of the trait (how heritable it is, what other traits it is correlated with), performance of ancestors, progeny and siblings, and non-genetic (environmental) factors affecting performance (nutrition, management groups, age, sex, twin/single, age of dam etc.)



All ASBVs are provided with accuracies (expressed on a % basis) that increase as more data on that trait is analysed from the animal or its relatives, indicating increased reliability in the ASBVs. Only ASBVs with accuracies above a particular threshold are published, to ensure their usefulness. Indexes, which are combinations of specific ASBVs, also now have accuracies.

To assess how an animal rates against others for a trait, its ASBV can be looked up on a percentile chart. Each ASBV has a percentile chart that shows the range of ASBVs for that trait.

The Sheep Genetics website: www.sheepgenetics.org.au, provides producers with the capacity to do standard and customised searches of the LAMBPLAN and MERINOSELECT databases to find rams that suit various breeding objectives.

When starting to use ASBVs, choose one or two important traits and build these into the current selection program.



Photo: Lambpro

ABOVE: Visual assessment can be misleading—these two animals have the same genetics and ASBVs, however, the larger ram was raised as a single and the smaller as a triplet

Some genetic terms producers should become familiar with...

The *phenotype* of an animal is what you see or measure. It is the combination of the animal's genes (its *genotype*) and its environment.

A sheep passes on the genetic portion of its phenotype to its progeny. *Heritability* describes how large that portion is as a percentage or a decimal figure, for instance, yearling body weight (YWT) is 30% heritable or has a heritability of 0.3.

Many traits are also *correlated*, so that if one trait changes, so does another. The relationship may be favourable if both change in the desired direction, however correlations can be unfavourable, such as fleece weight and fibre diameter, where a higher fleece weight is generally related to a higher (less desirable) fibre diameter.

Source: Sheep Genetics

PWT percentiles	
Top value	11.8
Top 1%	9.3
Top 5%	7.8
Top 10%	7.0
Top 20%	5.9
Top 30%	5.1
Top 40%	4.4
Top 50%	3.7
Top 60%	3.1
Top 70%	2.4
Top 80%	1.6
Top 90%	0.2
Bottom value	-5.9

ABOVE: Post Weaning Weight percentile chart

As confidence is gained more ASBV traits can be added as required or desired. Remember:

- Genetics is the only way to make permanent change to a flock.
- ASBVs use a range of information to calculate values.
- Look carefully at all ASBVs to ensure that you are selecting the better genetics.

More information
Sheep Genetics
02 6773 2948
info@sheepgenetics.org.au
www.sheepgenetics.org.au