Sheep GENETICS

MEAT & LIVESTOCK AUSTRALIA

LAMBPLAN ASBV

MERINOSELECT ASBV

A pocket guide to ASBVs

Australian Sheep Breeding Values

Contents

Sheep Genetics

Sheep Genetics delivers the national genetic evaluation services for the Australian sheep and goat industry. Providing a common genetic language in the form of Australian Sheep Breeding Values (ASBVs) to stud and commercial sheep producers.

Sheep Genetics uses data from a range of sources including ram breeders, research flocks and genomic tests to calculate ASBVs.

ASBVs are reported for a range of important production, health and welfare traits. This allows producers to benchmark genetics for key traits regardless of the environment.

ASBVs can be found on the Sheep Genetics search site.

What is an Australian Sheep Breeding Value (ASBV)?

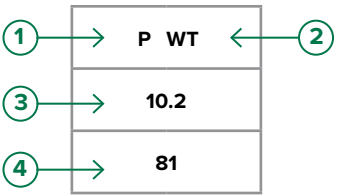
An Australian Sheep Breeding Value (ASBV) is an estimate of the genetic potential a sheep will pass on to its progeny. These values are available for a range of economically important traits and are designed to be used in conjunction with visual selection.

The appearance and performance of an animal is a combination of its genes and the environment in which it is raised (e.g. the amount and quality of feed, whether it was born a single or twin). ASBVs account for these environmental effects, allowing the comparison of sheep based on the genes they will pass on to their progeny.

Important points to consider when utilising ASBVs in your breeding program

- Remember you are choosing the genes, not the environment they were raised in.
- Use the age stage most appropriate to your production system. For example, if you are selling seven-month-old lambs, post-weaning traits for growth and muscle would be most relevant.

How to interpret ASBVs



1. Age stage

The first letter is the age stage*.

B = Birth
W = Weaning 1 to 5 months (40–149 days)
P = Post-weaning 5 to 10 months (150–299 days)
Y = Yearling 10 to 15 months (300–449 days)
H = Hogget 15 to 22 months (450–659 days)
A = Adult greater than 22 months (>660 days)

* Some traits are reported as early (E) (<4 months) or late (L) (>4 month age stages).

2. Trait name

The trait is expressed as an abbreviation of the trait name. This example is weight (WT).

3. ASBV

ASBVs are expressed as either positive or negative deviations from an average. This example for post-weaning weight (PWT) is 10.2kg. As rams contribute half the genetics of their progeny (the ewe the other half), the resulting progeny will be (on average) 5.1kg heavier at post-weaning than the progeny of a ram with a PWT ASBV of 0.

4. ASBV accuracy (%)

This is a reflection of the amount of information available on each animal for each trait. As the amount of information increases, the accuracy increases. The higher the accuracy, the closer the ASBV is to the true breeding value of the animal.

What is a selection index?

Indexes help you select animals for use within a breeding program when there are many traits of importance. Indexes combine important production traits into a single value and are a useful way to rank animals quickly and easily.

Using indexes in your ram purchasing decisions allows you to make balanced genetic progress towards more profitable sheep for your production system. A ram with a higher index will produce progeny that are more profitable in that production system.

There are a number of indexes available for each of the analyses.

For more information on the indexes available for your analysis, please refer to the Sheep Genetics index documentation.

Using selection indexes

It's important to use the index that:

- is most relevant to your production system and your breeding objective
- puts emphasis on your economically important traits.

Below are ASBVs and index values for two sheep in the Sheep Genetics database. Note the index value is similar for both animals, however, they have different ASBVs for the traits contributing to this index. While indexes are useful tools, it is important to always consider individual trait ASBVs to ensure you are selecting genetics that will meet your objective.

Ram sale checklist

Before the sale:

- Rank animals in the sale on your chosen index.
- Consider the individual ASBVs which are important to you to create a shortlist of rams to look at on sale day.

At the sale:

- Look through your short list of rams to find the ones that meet your structural and type requirements.

Ram ID	PWT (kg)	PFAT (mm)	PEMD (mm)	LMY (%)	IMF (%)	Index
Ram 1	22.55	3.35	0.90	3.16	0.22	170.93
Ram 2	19.95	3.91	-0.46	5.06	-0.34	170.88

ASBVs for liveweight traits

Example liveweight ASBVs

Trait abbreviation	BWT (kg)	MWWT (kg)	WWT (kg)	PWT (kg)	YWT (kg)	HWT (kg)	AWT (kg)
ASBV	0.28	2.20	5.94	9.09	10.95	11.60	11.27
Accuracy (%)	84	84	88	88	88	87	85
Compared to a ram with an ASBV of 0, this ram's progeny will be:	0.14kg heavier at birth	Produce daughters who wean lambs that are 1.1kg heavier	2.97kg heavier at weaning	4.55kg heavier at post-weaning	5.48kg heavier at yearling	5.8kg heavier at hogget	5.64kg heavier as adults

Liveweight ASBV definitions

BWT: Birth weight (kg)

Rams with more negative BWT ASBVs produce lambs which are lighter at birth.

What it estimates: The genetic difference between animals in liveweight at birth.

WT: Weight (kg)

Rams with a more positive ASBV for weight (WT) will produce lambs that grow faster and therefore reach target weights in a shorter period of time. WT ASBVs are reported at weaning (WWT), post-weaning (PWT), yearling (YWT), hogget (HWT) and adult (AWT) ages.

What it estimates: The genetic difference between animals in liveweight at a given age.

MWWT: Maternal weaning weight (kg)

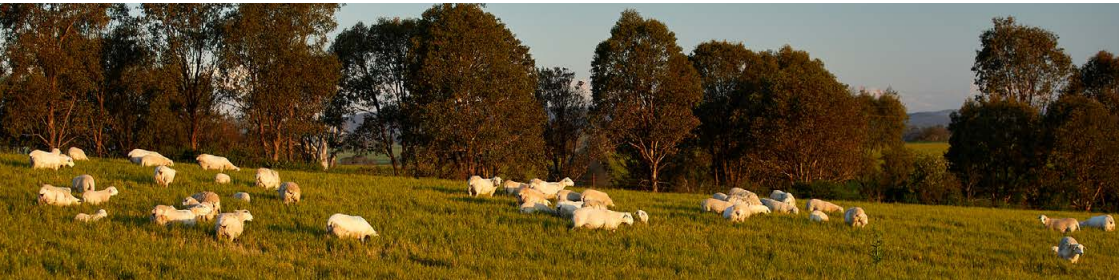
Rams with more positive MWWT ASBVs will produce daughters that wean heavier lambs.

What it estimates: The daughter's ability to milk and provide a good maternal environment.

ASBVs for carcase traits

Example carcase ASBVs

Trait abbreviation	PFAT (mm)	PEMD (MM)	CFAT (mm)	CEMD (mm)
ASBV	1.00	2.50	0.80	2.00
Accuracy (%)	63	65	62	62
Compared to a ram with an ASBV of 0, this ram's progeny will be:	On average 0.5mm fatter at post-weaning	1.25mm deeper in the eye muscle at post-weaning	0.4mm fatter when measured on the carcase post-slaughter	1mm deeper eye muscle when measured on the carcase post-slaughter



Carcase ASBV definitions

FAT: Fat depth (mm)

Rams with more positive FAT ASBVs will produce lambs that are fatter, at the same weight. FAT is reported at weaning (WFAT), post-weaning (PFAT), yearling (YFAT) and hogget (HFAT) ages.

What it estimates: The genetic difference between animals in fat depth.

CFAT: Carcase fat (mm)

Rams with more positive CFAT ASBVs will produce lambs that have a higher amount of carcase fat depth. It is measured on the animal post-slaughter.

What is estimates: The genetic difference between animals in fat depth measured on the carcase post-slaughter.

EMD: Eye Muscle Depth (mm)

Rams with more positive EMD ASBVs will produce lambs that have more muscle. EMD is reported at weaning (WEMD), post-weaning (PEMD), yearling (YEMD) and hogget (HEMD) ages.

What it estimates: The genetic difference between animals in eye muscle depth.

CEMD: Carcase eye muscle depth (mm)

Rams with more positive CEMD ASBVs will produce lambs that have a higher amount of eye muscle depth on the carcase post-slaughter.

What it estimates: The genetic difference between animals in eye muscle depth measured on the carcase post-slaughter.

ASBVs for lean meat yield and eating quality traits

Example lean meat yield and eating quality ASBVs

Trait abbreviation	LMY (%)	IMF (%)	SHEARF5 (nM)
ASBV	2.40	0.50	-1.60
Accuracy (%)	62	67	55
Compared to a ram with an ASBV of 0, this ram's progeny will have:	1.2% greater lean meat yield	0.25% more intramuscular fat	0.8 nM lower shear force

Lean meat yield and eating quality ASBV definitions

LMY: Lean meat yield (%)

Rams with more positive LMY ASBVs produce lambs that have a higher lean meat yield at slaughter.

Lean meat yield is expressed as a percentage of hot standard carcase weight, where all bones and salvage fat are removed.

What it estimates: The genetic difference between animals in lean meat yield derived from the carcase.

IMF: Intramuscular fat (%)

Rams with more positive IMF ASBVs produce progeny with more intramuscular fat. It is a measure of the fat percentage in the loin muscle of a lamb and is often referred to as marbling. IMF has been shown to have a significant impact on the flavour, juiciness, tenderness and overall liking of lamb.

What it estimates: The genetic difference between animals in intramuscular fat expressed in the meat.

SHEARF5: Shear force (nM)

Rams with more negative SHEARF5 ASBVs produce lambs with more tender meat. It is a measure of the force or energy required to cut through the loin muscle of lamb after five days of ageing, and is reported in deviations of kilograms of force.

What it estimates: The genetic difference between animals in shear force required to cut a piece of meat.

ASBVs for fleece traits

Example fleece ASBVs

Trait abbreviation	YCFW (%)	YFD (µm)	YDCV (%)	YSS (N/Ktex)	YSL (mm)	YCUR (°/mm)
ASBV	24.00	-2.00	-1.00	4.00	8.60	4.80
Accuracy (%)	69	70	67	62	72	76
Compared to a ram with an ASBV of 0, this ram's progeny will have:	12% more clean fleece weight at yearling	1.0 micron finer at yearling	0.5% less variation in micron at yearling	2 N/Ktex stronger staple at yearling	4.3mm longer staple at yearling	2.4°/mm higher curvature as yearling

Fleece ASBV definitions

Fleece ASBVs estimate the genetic difference between animals for measurable wool characteristics. They are available at post-weaning (P), yearling (Y), hogget (H) and adult (A) ages.

CFW: Clean fleece weight (%)

Rams with higher CFW ASBVs will produce progeny that cut more wool.

What it estimates: The genetic difference between animals in clean fleece weight.

FD: Fibre diameter (µm)

Rams with lower FD ASBVs will produce progeny that have finer wool.

What it estimates: The genetic difference between animals in fibre diameter.

DCV: Fibre diameter coefficient of variation (%)

Rams with lower DCV ASBVs will produce progeny with lower variation in fibre diameter.

What it estimates: The genetic difference between animals in fibre diameter CV.

SS: Staple strength (N/Ktex)

Rams with more positive SS ASBVs will produce progeny with stronger staples.

What it estimates: The genetic difference between animals in staple strength.

SL: Staple length (mm)

Rams with more positive SL ASBVs will produce progeny with longer fibre length.

What it estimates: The genetic difference between animals in staple length.

CUR: Curvature (°/mm)

Rams with more positive CUR ASBVs will produce progeny which have more crimp.

What it estimates: The genetic difference between animals in fibre curvature.

ASBVs for reproduction traits

Example reproduction ASBVs

Trait abbreviation	WR	CON	LS	ERA
ASBV	0.2	0.06	0.18	0.04
Accuracy (%)	55	42	40	39
Compared to a ram with an ASBV of 0, this ram's daughter will:	Wean 0.1 more lambs per ewe joined	Will have 0.03 higher conception rate	Give birth to 0.09 more lambs per pregnant ewe	Rear 0.02 more of the lambs in their litter

Reproduction ASBV definitions

WR: Weaning Rate

Rams with more positive WR ASBVs will produce daughters that wean more lambs.

What it estimates: The genetic difference between animals for the number of lambs weaned per ewe joined.

CON: Conception

Rams with more positive CON ASBVs will produce daughters which have higher conception rates.

What it estimates: The genetic difference between animals for conception.

LS: Litter size

Rams with more positive LS ASBVs will produce daughters that give birth to more lambs.

What it estimates: The genetic difference between animals for litter size.

ERA: Ewe rearing ability

Rams with more positive ERA ASBVs will produce daughters which rear more of their litter.

What it estimates: The genetic difference between animals for rearing ability.

Note: Reproduction traits are also reported at yearling age stage (YWR, YCON, YLS, YERA) which refers to reproduction performance as ewe lambs.

ASBVs for health and welfare traits

Example health and welfare ASBVs

Trait abbreviation	PWEC (%)	EBWR	LDAG
ASBV	-40	-1.0	-0.90
Accuracy (%)	60	70	49
Compared to a ram with an ASBV of 0, this ram's progeny will:	Have 20% less worms at post-weaning age	Produce lambs that are 0.5 score plainer in the breech area	Have 0.45 score less dag

Health and welfare ASBV definitions

WEC: Worm egg count (%)

Rams with more negative WEC ASBVs produce progeny who have a higher genetic potential to resist worm burdens. Lower WEC ASBVs are desirable. WEC ASBVs are available at weaning (WWEC), post-weaning (PWEC), yearling (YWEC) and hogget (HWEC) ages.

WEC ASBVs are expressed as a percentage relative to a count of 500 eggs per gram.

What it estimates: The genetic difference between animals in worm resistance.

EBWR: Early breech wrinkle

Rams with more negative EBWR ASBVs produce progeny who have a plainer breech. Breech wrinkle is recorded as a score, where a lower score indicates less wrinkle (therefore lower EBWR tends to be more desirable).

What it estimates: The genetic difference between animals in the amount of wrinkle in the breech area.

LDAG: Late dag

Rams with more negative LDAG ASBVs will produce progeny who have less dag. Dag is recorded as a score, where a lower score indicates less dag (therefore lower LDAG ASBVs are desirable).

What it estimates: The genetic difference between animals in dag around the breech area.

Note: EBWR and LDAG are important indicator traits for flystrike, where less wrinkle/plainer breech and less dag tend to reduce the incidence of flystrike by reducing and limiting the conditions that promote flystrike.

Percentile band reports

Percentile bands show the range of ASBVs across all animals in the current year drop.

Percentiles allow you to benchmark an animal for traits compared to other animals within their analysis.

There are traits that have an optimum value (such as FAT) where a high percentile isn't necessarily the best outcome.

For example:

If an animal is in the 1st percentile, it is one of the highest performing animals for that trait.

If it's in the 50th percentile, it is around average.

If it's in the 90th percentile, it is one of the lowest performing animals.

Percentile band tables are located on the Sheep Genetics search website, listed with the analysis date and drop year to ensure you are comparing ASBVs to the current analysis.

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