

PDS Updates webinar Q&A: Unlocking genetic gain in Merino flocks

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This Q&A document supports the 'Unlocking Genetic Gain in Merino Flocks' webinar, part of MLA's national Producer Demonstration Sites (PDS) Updates webinar series, which showcases practical, producer-led projects delivering productivity and sustainability outcomes.

The Implementing and Optimising Genomic Prediction Tools for Commercial Merino Producers Integrated R&D MLA Producer Demonstration Site (PDS) project, delivered in partnership with SheepMetriX, aims to demonstrate how commercial Merino producers can use current and emerging genetic and genomic tools—individually or in combination—to accelerate genetic gain and improve flock performance.

The webinar highlighted the practical application of tools including Flock Profile, Ram Team Manager, Australian Sheep Genomic Values (ASgVs) and Australian Sheep Breeding Values (ASBVs). Presenter Sally Martin (SheepMetriX) shared participant experiences, key learnings emerging from the demonstration sites, and practical insights into incorporating genetic and genomic technologies into commercial breeding programs.

The following questions were submitted during the webinar. Responses have been provided by the project team to support participants seeking further information on the topics discussed.

The responses reflect professional observations, project learnings and practical experience gained through this Producer Demonstration Site project. They are intended to support discussion and inform decision-making and should be considered alongside property-specific objectives, circumstances and professional advice where appropriate.

Questions not addressed during the live webinar have been answered using publicly available information from industry resources. Sources are provided where applicable.

Q. For producers considering genomic testing, what is the approximate per-head cost of obtaining ASgV results?

A. The cost of genomic testing for ASgVs varies between providers. As pricing structures can change over time producers are encouraged to contact genomic service providers directly for current pricing and service information. A list of genomic service providers, including contact details, is available on the Sheep Genetics website: <https://www.sheepgenetics.org.au/resources/genomics/#genotyping>

When considering genomic testing, producers may also wish to discuss with the service provider how ASgVs will be used within their breeding program and which animals are likely to provide the greatest value from testing.

Q. How are differences in lamb age accounted for when assessing post-weaning weight, given lambs within a drop can sometimes vary in age by 5–7 weeks? In this situation, is yearling weight generally considered a more accurate or reliable measure of genetic performance?

A. Differences in lamb age are accounted for within the Australian Sheep Breeding Values (ASBV) evaluation system through the inclusion of factors such as date of birth, birth type, rear type and dam age. These details are important for accurately separating genetic merit from environmental influences when assessing traits, particularly those measured at early age stages like weaning weight.

Australian Sheep Genomic Values (ASgVs), by comparison, are based solely on an animal's genomic information, which is determined by its relationship to animals in the reference population (animals that have been genotyped and phenotypically recorded for each trait). ASgVs rely on the reference population being well recorded and therefore do not incorporate phenotypic or management data such as age, birth type or rear type.

Q. How often should a Flock Profile be reviewed or updated, and what is the recommended process for producers who completed one in a previous year?

A. As a general guide, a Flock Profile is typically reviewed every three to five years, although the appropriate interval will depend on the rate of genetic change being pursued within the breeding program.

For producers who have previously completed a Flock Profile, comparing results over time can provide valuable insights into genetic progress. To ensure a valid comparison, it is important that both Flock Profiles are generated from the same Sheep Genetics run date. To update an older Flock Profile, producers can contact Sheep Genetics or access up-to-date results on their RamSelect account. Sheep Genetics is aiming to release a Flock Profile portal on their website in the next couple of months.

Q. If I wanted to better understand these products (Flock Profile, ASgVs, ASBVs) where could I go for more information?

A. A range of resources are available to help producers better understand genetic and genomic tools used in sheep breeding programs.

The [Sheep Genetics website](#) provides information on Flock Profiles, Australian Sheep Genomic Values (ASgVs), Australian Sheep Breeding Values (ASBVs) and their application in breeding decisions. In addition, several commercial genotyping companies offer information and technical resources relating to their genomic testing products and services.

Q. How exactly does the raw DNA/SNP data feed into the calculation for the final percentile bands? Is it based purely on a cumulative genomic scoring system ranked against the current year's drop, or are there other dynamic weighting factors we need to account for?

A. The percentile bands are not based on a simple cumulative score of favourable SNPs. Instead, the animal's DNA profile is compared against a large reference population of sheep that have both genomic data and measured performance records. Statistical models estimate the contribution of

thousands of SNP markers across the genome to a range of economically important traits such as growth, wool production, reproduction and health traits.

For Australian Sheep Genomic Values (ASgVs), those genomic predictions are then converted into within-flock percentile rankings for each trait and index. The percentile reflects where an individual animal ranks relative to the other animals tested within that cohort, rather than against all sheep nationally. For example, an animal in the top percentile band for post-weaning weight has a stronger genomic prediction for that trait than most other animals tested in the same group.

There are several factors influencing the final prediction beyond simply counting favourable SNPs:

- The effect of each SNP is weighted according to its estimated association with the trait in the reference population.
- Thousands of markers are considered simultaneously, with some having larger effects than others.
- Different traits have different prediction equations and marker weightings.
- Selection indexes (such as Sustainable Merino, Wool Production, Fine Wool and Merino Lamb) apply additional economic weightings across multiple traits to produce an overall index ranking.

Importantly, ASgV percentile rankings are based on genomic predictions only. Unlike ASBVs, they do not incorporate the animal's own performance records, pedigree information or environmental effects such as age, birth type, nutrition or management. Those additional sources of information are included in ASBVs, which is why ASBVs remain the industry's gold-standard genetic evaluation.

So, in summary, the percentile bands are derived from sophisticated genomic prediction models trained on a reference population, with SNP effects weighted according to their relationship with each trait. The final percentile ranking shows where an animal sits relative to its tested cohort and is not simply a cumulative genomic score based on the current drop alone.

Q. Could you please explain who the different genetic products—Flock Profile, ASgVs and ASBVs—are primarily designed for, and when each should be used? For example, if there is a commercial producer purchasing rams, which tool would be most relevant to help inform their selection decisions?

A. ASBVs: Gold standard genetic selection tool aimed at seedstock producers. These incorporate phenotypic recording, management recording and pedigree recording (often via genotyping). They allow for across flock, across breed comparisons to be made at an individual animal level. ASBVs can be accessed on the Sheep Genetics website for participating flocks.

ASgVs: Within flock percentile ranking tool based on genotypes only, aimed at commercial producers breeding their own rams or aiming to genetically select animals from within specific groups of animals. These are individual animal level but can only be used to compare animals within a test group. All ASgV orders are accompanied by a Flock Profile, which allows producers to benchmark against ASBVs.

Flock Profiles: Mob level benchmarking tool for commercial producers. This requires 20 sheep to be genotyped from a specific cohort and provides a genetic benchmark of the cohort in ASBV units.

Flock Profiles are used by producers to benchmark current genetic merit for a range of traits, allowing producers to select rams that drive genetic progress towards their breeding objective.

Q. Where would you recommend producers go to learn more about genetic and genomic selection and how to apply these tools effectively?

A. There are a range of resources and training opportunities available for producers looking to build their understanding of genetic and genomic selection and apply these tools within their breeding program.

The Sheep Genetics website provides information on Australian Sheep Breeding Values (ASBVs), genomic breeding values, ram selection and breeding objective development:

<https://www.sheepgenetics.org.au/>

The MLA Genetics Hub brings together practical resources, tools, case studies and learning materials to support informed breeding decisions: <https://www.genetics.mla.com.au/merino/>

Producers may also benefit from participating in Bred Well Fed Well, an industry training program that helps producers develop practical skills in genetics, reproduction, nutrition and management to improve flock productivity and profitability. <https://www.mla.com.au/extension-training-and-tools/bredwell-fedwell/>

MLA's Profitable Grazing Systems (PGS) program also offers producer training packages in areas such as breeding and reproduction, depending on regional delivery. Information on available PGS programs can be found at: <https://www.mla.com.au/extension-training-and-tools/profitable-grazing-systems/>

In addition, producers can work with their ram breeder, livestock advisor or breed society to determine how genetic and genomic tools can best be applied to their specific production system and business objectives

Q. As a commercial merino producer who is breeding my own rams using industry AI sires, how do I access Australian Sheep Genomic Values (ASgVs)?

A. ASgVs are available through a number of genomic service providers that offer sheep genotyping and genomic services. These providers can assist producers with DNA testing and the generation of ASgVs, which can be used alongside ASBVs to support ram selection and breeding objectives.

A list of genomic service providers, including contact details, is available on the Sheep Genetics website:

<https://www.sheepgenetics.org.au/resources/genomics/>

If you are breeding your own rams, it may also be beneficial to discuss your breeding objectives and genomic testing options with a genetics advisor, Sheep Genetics representative, genomic service provider, or consultant. They may help determine the most appropriate testing strategy and how ASgVs can be incorporated into your breeding program to accelerate genetic gain and inform selection decisions.

Q. To better understand which rams I should be purchasing to meet my breeding objective, is there somewhere I can go to see all ram's ASBVs compared?

A. Yes. The Sheep Genetics search website allows producers to search for and compare individual animals, and compare their ASBVs across all reported traits. Producers can search for specific animals if they know their ID, or search for animals based on criteria e.g. male Merino animals born in 2025, that have an index in the top 20% of industry.

<https://search.sheepgenetics.org.au/search/dashboard>

The platform also enables producers to compare multiple animals side-by-side, making it easier to identify rams that align with their breeding objectives and target traits.

In addition to the Sheep Genetics Search database, many ram breeders publish ASBVs, indexes and sale catalogues online prior to ram sales. Reviewing these catalogues can help producers identify potential sires and compare their genetic merit against their breeding goals.

Before selecting rams, producers are encouraged to clearly define their breeding objective and focus on the ASBVs and indexes that are most relevant to their production system, market requirements and business goals. The Sheep Genetics website provides resources to help producers understand ASBVs, selection indexes and how to use genetic information in breeding decisions:

<https://www.sheepgenetics.org.au/>

Producers seeking additional guidance may also wish to discuss ram selection with their ram breeder, genetics advisor, livestock consultant or Sheep Genetics representative, who can help interpret ASBVs and identify rams that best fit their breeding program.

Q. Just to clarify, ASgVs are within flock ranking tools and aren't presented as ASBVs so I can't compare them to ASBVs. But I will receive a Flock Profile with my ASgVs to help me benchmark against ASBVs and industry? Have you done any return on investment work to show the best use case for ASBVs vs ASgVs?

A. Correct. ASgVs are a within test group ranking tool, and are not expressed in the same units as ASBVs so they cannot be directly compared with ASBVs. Each ASgV order will be accompanied by a Flock Profile, which provides a cohort-level benchmark against industry using ASBV units. This enables producers to rank animals within their flock using ASgVs, while also understanding how their flock compares with industry benchmarks across a range of traits through the Flock Profile.

In relation to return on investment, a key objective of this PDS is to demonstrate the most appropriate use cases for each product and better understand where each tool provides value within commercial breeding programs. This includes assessing how genomic information can be used alongside existing genetic tools to support selection decisions and accelerate genetic gain. The findings of the project, along with producer case studies will be made publicly available once the PDS is completed.



Q. What strategies can producers use to maintain genetic diversity while continuing to make genetic gains and breeding sheep that are adaptable to changing environmental conditions?

A. This topic was not discussed in detail during the webinar. Breeding objectives should reflect the production system, environmental conditions and long-term goals of the enterprise. Producers seeking further information on balancing genetic gain, genetic diversity and flock resilience are encouraged to consult Sheep Genetics resources or seek advice from a breeding consultant.

Q. The current ovine reference (ARS-UI_Ramb_v2.0 and emerging T2T assemblies). You mentioned there is no reference genome, how do you integrate your genomic prediction and diversity modelling workflows with current gaps in functional annotation?

A. This topic was not specifically covered during the webinar and therefore has not been addressed as part of the session. If you are seeking further information on ovine reference genomes, functional annotation, and how these are incorporated into genomic prediction and diversity modelling workflows, we recommend contacting Sheep Genetics or the Animal Genetics and Breeding Unit (AGBU) directly, as they are best placed to provide detailed technical advice on these aspects.

If you have any questions, please feel free to email pds@mla.com.au and we will work with the team to assist with your enquiry.