How and when to score fleece shedding?

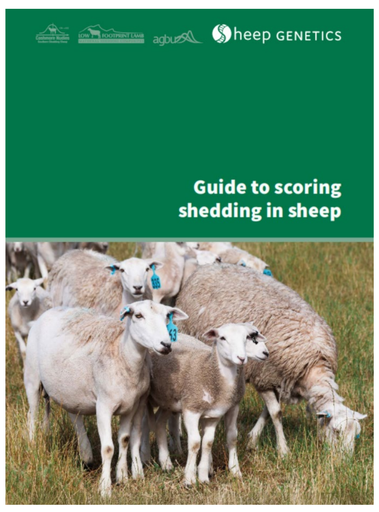
THE PROJECT

The project was a collaboration between Meat & Livestock Australia (through MLA Donor Company), Cashmore and Low Footprint Lamb, and the Animal Genetics and Breeding Unit.

The project improved understanding of the genetics underlying shedding.

A shedding breeding value has been developed for release in LAMBPLAN.

WHAT TO CONSIDER?



Ensure the scorer is appropriately trained and experienced to assess ‘shedding’.

Use the same scorer across years to minimise variation and allow for the best comparison between drops.

Score within management groups and record them, because groups may express differently.

Keep management groups as large as possible.

Information about shedding scores can be found at https://www.sheepgenetics.org.au

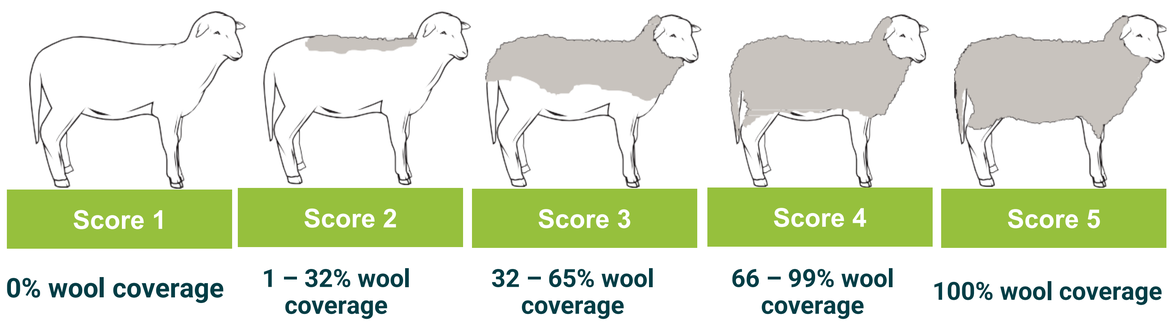
SCORES

Shedding scores range from 1, complete shed, to score 5, completely woolly

Score must take into account the proportion of the body covered by the current winter fleece, regardless of any retained wool from previous seasons

Shedding breeds vary in fleece type (coarse hair, silky hair, wool, or combinations)

Focus on the degree of shedding, not the type of fleece



Shedding score should be allocated irrespective of the length of the fleece that is yet to be shed by the animal.

Pattern of shedding is not the objective; instead, focus on the proportion of the fleece that is shed.

Multiple patterns have been provided to aid in scoring continuity across the scoring patterns.

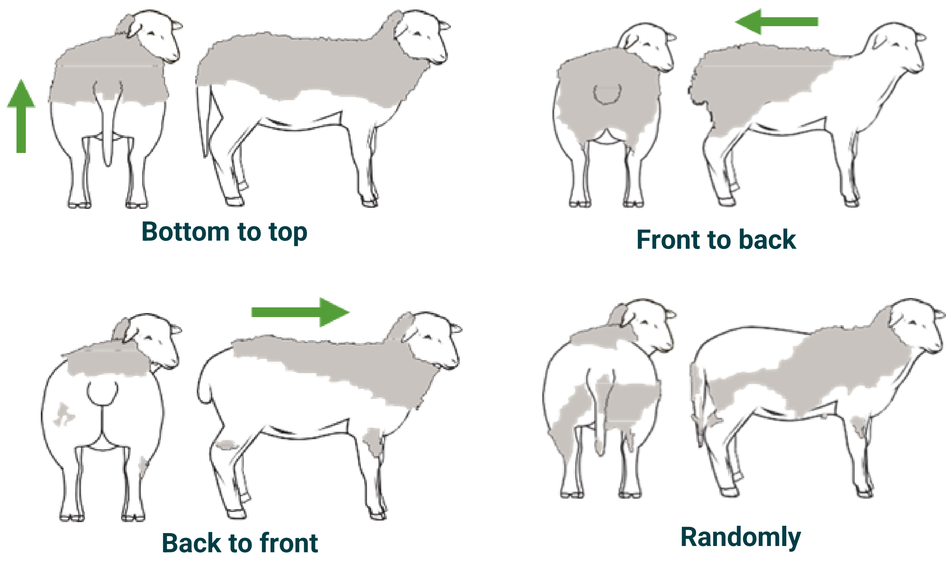


Diagram of common shedding pattern

WHEN TO SCORE?

Shedding in sheep follows a seasonal cycle, with fleece growth occurring as day length shortens into winter.

Shedding begins after the winter solstice as days lengthen.

Scoring should be carried out during spring to early summer (October – January), when variation in shedding is greatest.

Timing may vary with location, seasonal conditions, and nutritional status, with dry ewes typically shedding earlier than pregnant or lactating animals.

Young and multiple born lamb are more likely to be woollier than older and single-born lambs.

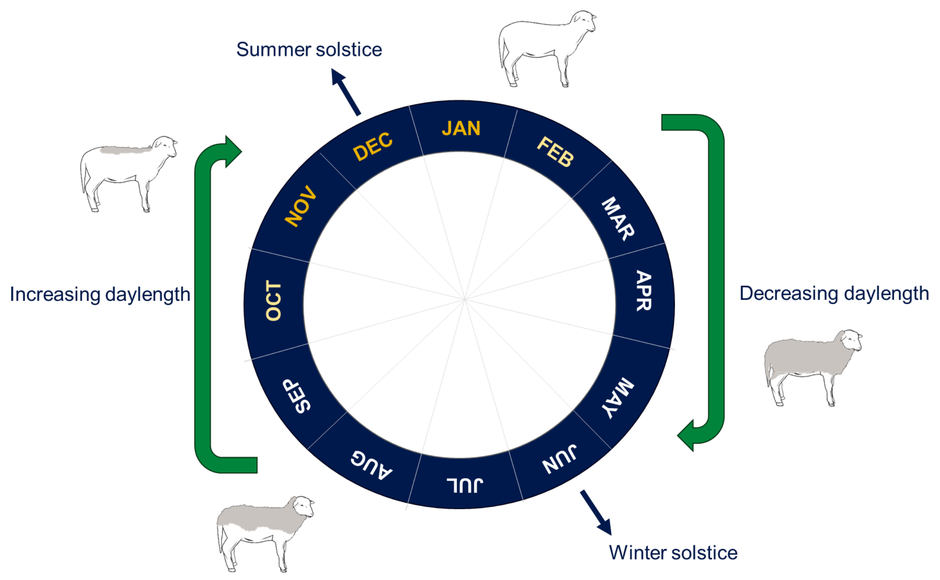


Diagram of the timing of shedding in relation to the time of year

FIND OUT MORE

Research outcomes
Erin Smith – erin.smith@une.edu.au
Sam Walkom – swalkom@une.edu.au

For advice on breeding shedding sheep
Matt Kelly - mpblkelly@gmail.com
John Keiller - cashmoreram@gmail.com

For information about Sheep Genetics
info@sheepgenetics.org.au.

Scan me!

The genetics of fleece shedding

What does the research tell us about breeding for shedding sheep?

HERITABILTY DEPENDS ON WHEN YOU SCORE

Heritability tells us how much of the difference between animals is due to genetics.

Higher heritability = faster genetic progress from selection

Early-season records (Jun–Sep) have lower heritability (~0.37) - shedding hasn't been fully expressed

Peak and late-season records (Oct–Feb) capture the most genetic variation (0.45–0.66)

Scoring during peak/late gives you the best information for breeding decisions

HOW MANY RECORDS?

Repeatability measures how consistently the scoring method produces similar results for the same animal, ranging from 0 (not repeatable) to 1 (perfectly repeatable).

Within-year: 0.54 (adults), 0.60 (yearlings) → A single score during peak/late season is highly reliable.

Across-year: 0.51 (adults) → Repeat records across years adds value.

WHAT THE DNA TELLS US?

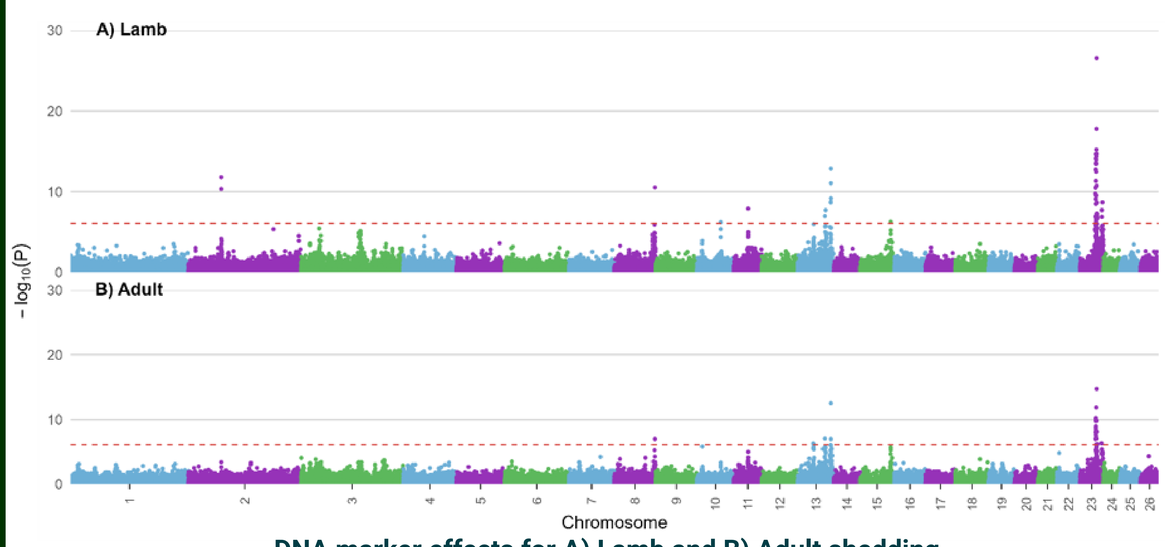
"Is there a single 'shedding gene'?

Not really.
Shedding is controlled by many genes across the genome, with a few regions of moderate effect."

Genetic mapping identified key regions of the genome with moderate effects on shedding, particularly on chromosome 23.

Around **20 significant genetic markers** were found, collectively explaining **7–8% of trait variation**.

However, shedding is controlled by many genes across the genome, not just a few major ones. No single region explained more than **~4–7% of the variation**.



DNA marker effects for A) Lamb and B) Adult shedding, points above the dashed red line are significantly associated with the shedding trait

Testing showed that simple breeding value models perform just as well as complex ones that account for these individual genomic regions

The Genomic BLUP based approach in LAMBPLAN is currently the best method to select for shedding

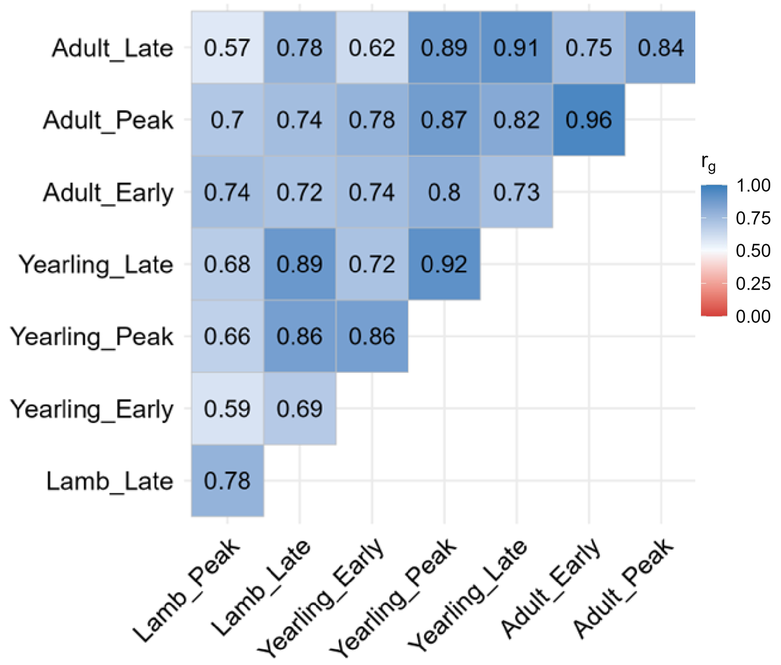
GENETICS ACROSS AGE CLASSES

Yearling–adult: Genetically very similar → yearling scores strongly predict adult performance.

Lamb–adult: Moderately correlated → useful as an early indicator, but not a perfect predictor of adult shedding.

Early vs. peak/late season: Genetically distinct expressions, suggesting different biological processes drive shedding at different times.

"In the national evaluation, lamb shedding will be treated as a separate but correlated trait to adult shedding. Adult shedding during peak/late season is the primary selection target."



Genetic correlations (r_g) between scoring times (early, peak and late) and different ages (lambs, yearlings and adults)

FIND OUT MORE

Research outcomes
Erin Smith – erin.smith@une.edu.au
Sam Walkom – swalkom@une.edu.au

For advice on breeding shedding sheep
Matt Kelly - mpblkelly@gmail.com
John Keiller - cashmoreram@gmail.com

For information about Sheep Genetics
info@sheepgenetics.org.au.

Scan me!

Breeding for shedding

Interpreting and using Breeding Values (ASBVs) for shedding?

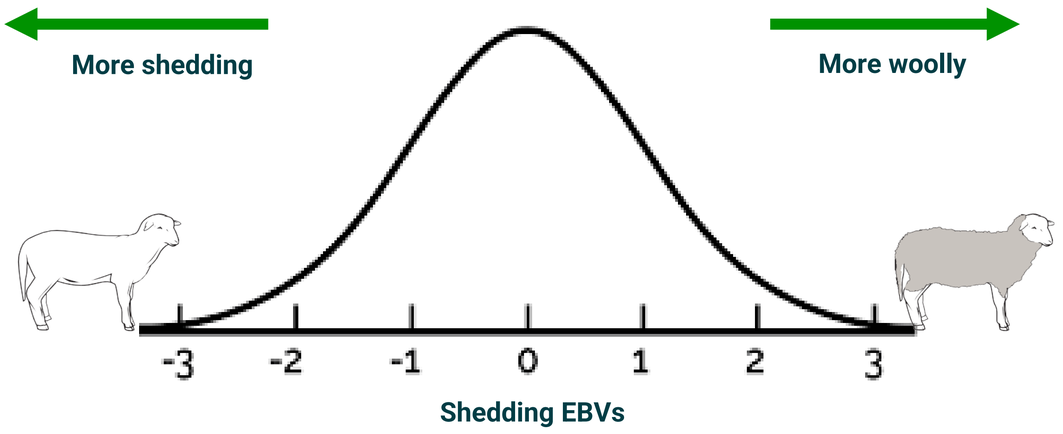
SHEDDING BREEDING VALUES EXPLAINED

An animal's phenotype (what it looks like) is influenced by both its **genetics** and its **environment**.

By accounting for environmental effects such as nutrition, management, age and season, ASBVs isolate the genetic component of performance.

This allows you to identify animals with superior genetics and predict which animals are most likely to pass desirable shedding characteristics to their offspring.

- The **more negative** the breeding value, the more 'shedding' their progeny will likely express.



RELATIONSHIP WITH PRODUCTION

Genetic correlations between shedding and body weight, carcase and visual traits were generally low. This means improving shedding can be achieved alongside these traits.

Antagonistic correlations were observed with some reproductive traits.

Highly productive ewes tended to express their shedding merit less.

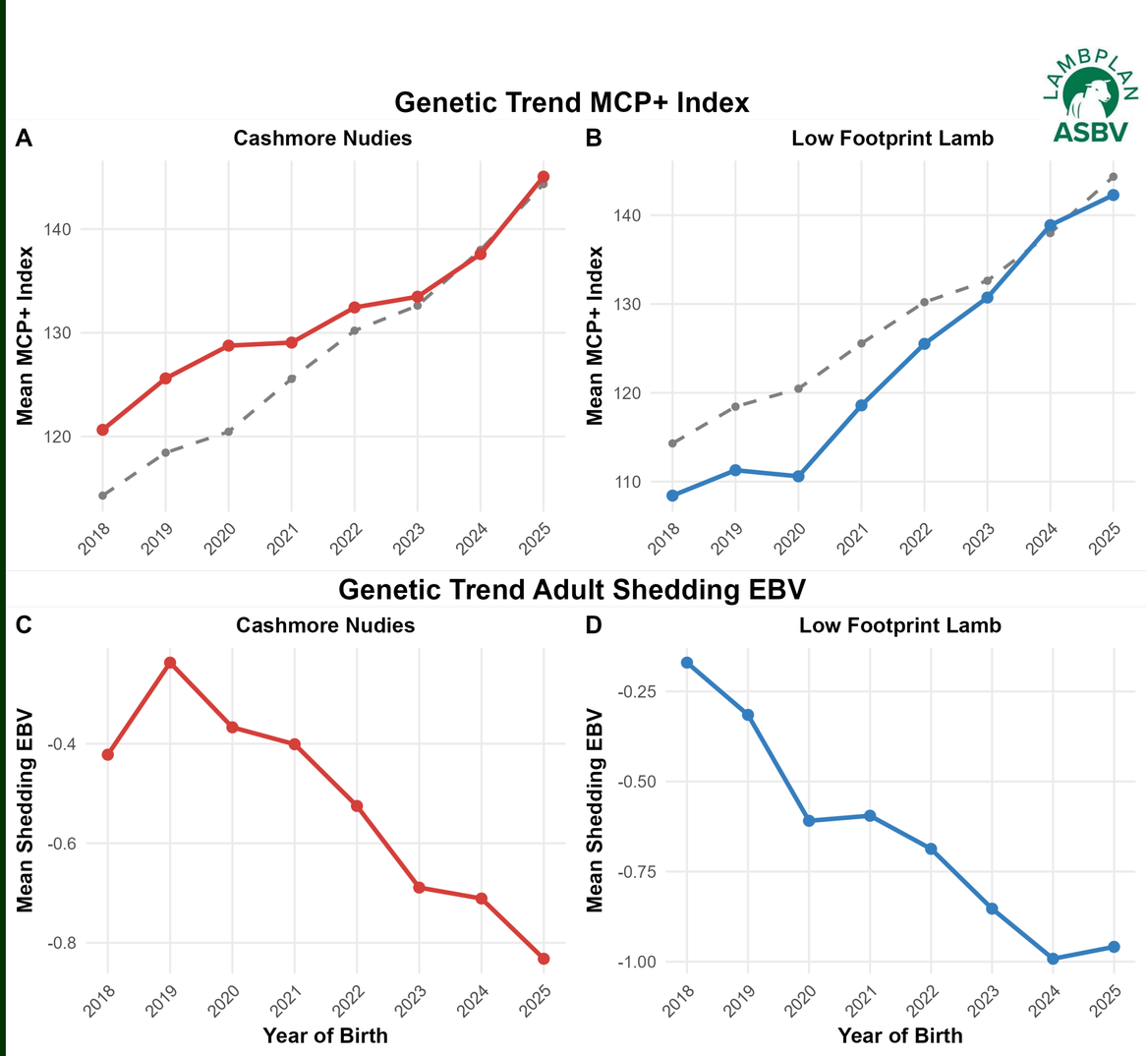
Selecting for shedding without accounting for reproduction may inadvertently favour animals with lower reproductive performance.

Table 1. Genetic and phenotypic correlations between adult shedding and production traits

Trait	Genetic	Phenotypic	Impact on better shedding animals
Body weight (all stages)	Negligible	Negligible	No effect on growth
Scan traits (fat, muscle)	Negligible	Negligible	No meaningful impact on carcase
Greasy fleece weight	Expected (0.54)	Expected (0.57)	Better shedders produce less wool
Staple length	Expected (0.65)	Expected (0.77)	Better shedders have shorter staples
Fibre diameter	Negligible (0.25)	Unfavourable (0.62)	Phenotypically, better shedders trend toward finer fibre
Worm egg count	Favourable (0.26)	Negligible (0.00)	Genetically, better shedders tend toward lower WEC
Yearling conception	Negligible (0.11)	Negligible (0.08)	No effect on yearling conception
Yearling litter size	Negligible (-0.01)	Unfavourable (0.55)	Phenotypically, better shedders have smaller yearling litters
Yearling ERA	Negligible (0.01)	Negligible (-0.03)	No significant effect on yearling rearing ability
Adult conception	Negligible (0.09)	Negligible (0.23)	No significant effect on adult conception
Adult litter size	Negligible (0.12)	Unfavourable (0.62)	Phenotypically, better shedders have smaller adult litters
Adult ERA	Negligible (0.11)	Negligible (0.10)	No effect on adult rearing ability
Condition score	Negligible	Negligible	No effect on body condition
Dag score	Negligible	Unfavourable (0.46)	Phenotypically, better shedders show slightly less dag

DOES IT WORK?

Over time, concurrent improvement can be made in both shedding and productivity.



Genetic improvement in the MCP+ index and adult shedding over time. The grey dashed line is the average of the Maternal LAMBPLAN analysis

FIND OUT MORE

Research outcomes
Erin Smith – erin.smith@une.edu.au
Sam Walkom – swalkom@une.edu.au

For advice on breeding shedding sheep
Matt Kelly - mpblkelly@gmail.com
John Keiller - cashmoreram@gmail.com

For information about Sheep Genetics
info@sheepgenetics.org.au.

Scan me!