Merino Genetic Progress – impact of the MLP project and where to from here?

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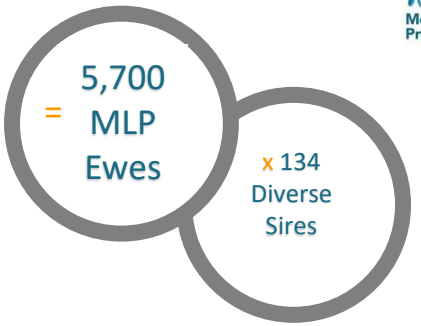
- What is the MLP Project?
- Industry impact of the MLP Project
- Latest tools and technologies to increase rate of genetic gain

What is the MLP Project?

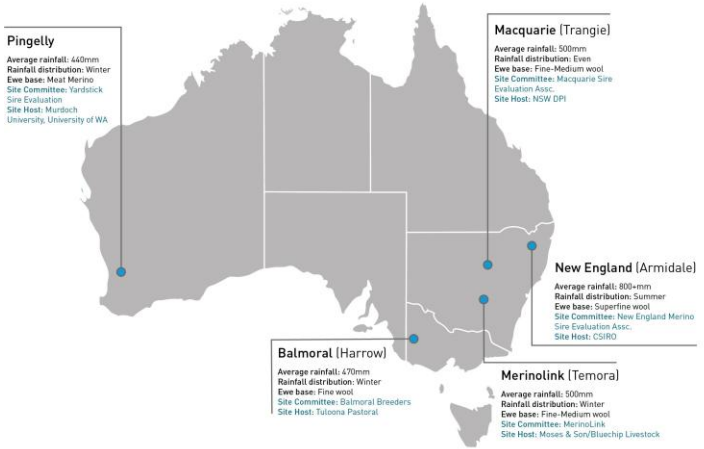
MLP
Merino Lifetime Productivity Project



- Captured lifetime data
- Across diverse environments, genetics & Merino types

Deliver increased profit through:

- Better understanding of the drivers of lifetime productivity
- Refining & testing current genetic selection tools



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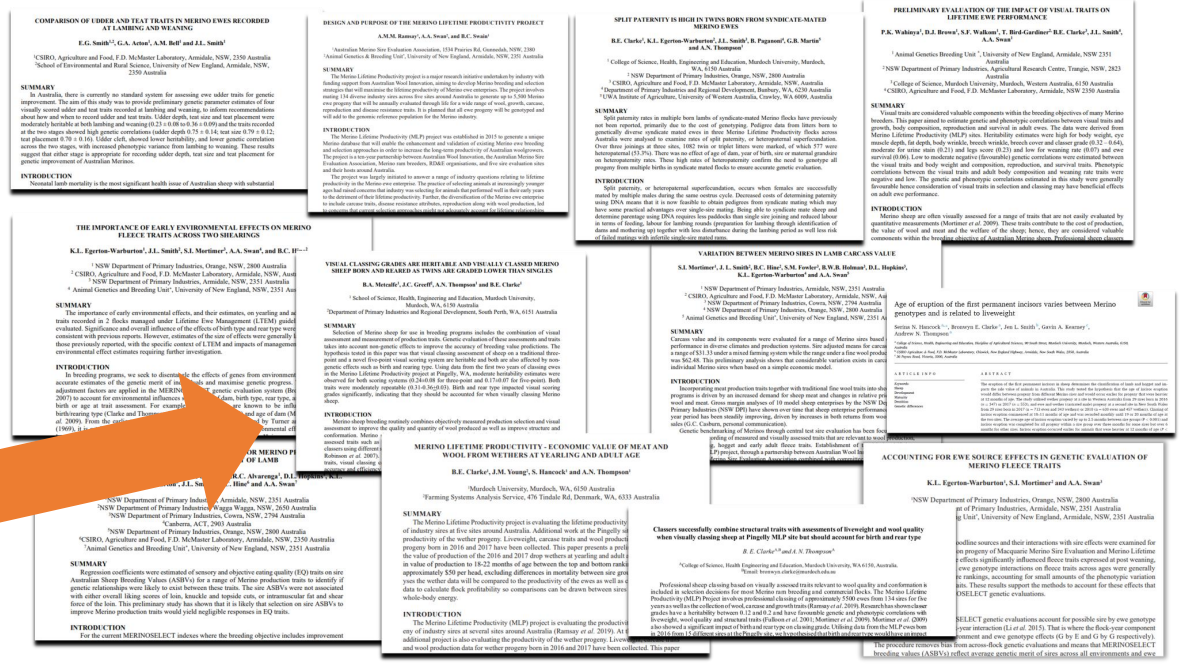
Australian Wool Innovation Limited

Australian Merino Sire Evaluation Association
MERINO
Superior Sires

Balmoral Breeders · Tuloona Pastoral · Moses & Son · bluechip livestock · Merino LINK · NSW Government Department of Primary Industries · Macquarie Sire Evaluation Association Inc · The Federation of Performance Sheep Breeders Western Australia (Inc) · Murdoch University · The University of Western Australia · New England Merino Sire Evaluation Association · CSIRO

Industry impact



COMPARISON OF UDDER AND TEAT TRAITS IN MERINO EWES RECORDED AT LAMBING AND WEANING

DESIGN AND PURPOSE OF THE MERINO LIFETIME PRODUCTIVITY PROJECT

SPLIT PATERNITY IS HIGH IN TWINS BORN FROM SYNDICATE-MATED MERINO EWES

PRELIMINARY EVALUATION OF THE IMPACT OF VISUAL TRAITS ON LIFETIME EWE PERFORMANCE

THE IMPORTANCE OF EARLY ENVIRONMENTAL EFFECTS ON MERINO FLEECE TRAITS ACROSS TWO SHEARINGS

VISUAL CLASSING GRADES ARE HERITABLE AND VISUALLY CLASSED MERINO SHEEP BORN AND REARED AS TWINS ARE GRADED LOWER THAN SINGLES

VARIATION BETWEEN MERINO SIRES IN LAMB CARCASS VALUE

Age of eruption of the first permanent incisors varies between Merino genotypes and is related to liveweight

MERINO LIFETIME PRODUCTIVITY - ECONOMIC VALUE OF MEAT AND WOOL FROM WETHERS AT YEARLING AND ADULT AGE

ACCOUNTING FOR EWE SOURCE EFFECTS IN GENETIC EVALUATION OF MERINO FLEECE TRAITS

Classers successfully combine structural traits with assessments of liveweight and wool quality when visually classing sheep at Pingelly MLP site but should account for birth and rear type

What does it mean for you?

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Udder traits are heritable (0.23-0.36)

Lamb mortality was significantly higher for ewes with unsound versus sound udders.

Autopsy results showed that lambs from dams with unsound udders were significantly more likely to die from starvation than any other cause.

"…these results support the methods to account for these effects that are routinely used in MERINOSELECT genetic evaluations "

"…yearling and adult fleece weight traits examined were influenced significantly by birth type "

"…heritability of GRADE (0.21-0.24) and PROF (0.18) are moderate and repeatable"

on average 53.3% of twins and triplets come from more than one sire

"…analyses are underway to estimate the accurate genetic parameters needed to include an EQ breeding value in MERINOSELECT indexes "

Reproduction & Genotyping

- Reproduction
  - low heritability
  - Hard to measure
- MLP data & genotypes in MERINOSELECT since 2020
- Key role in development of new reproduction analysis

Reproduction Reference Population

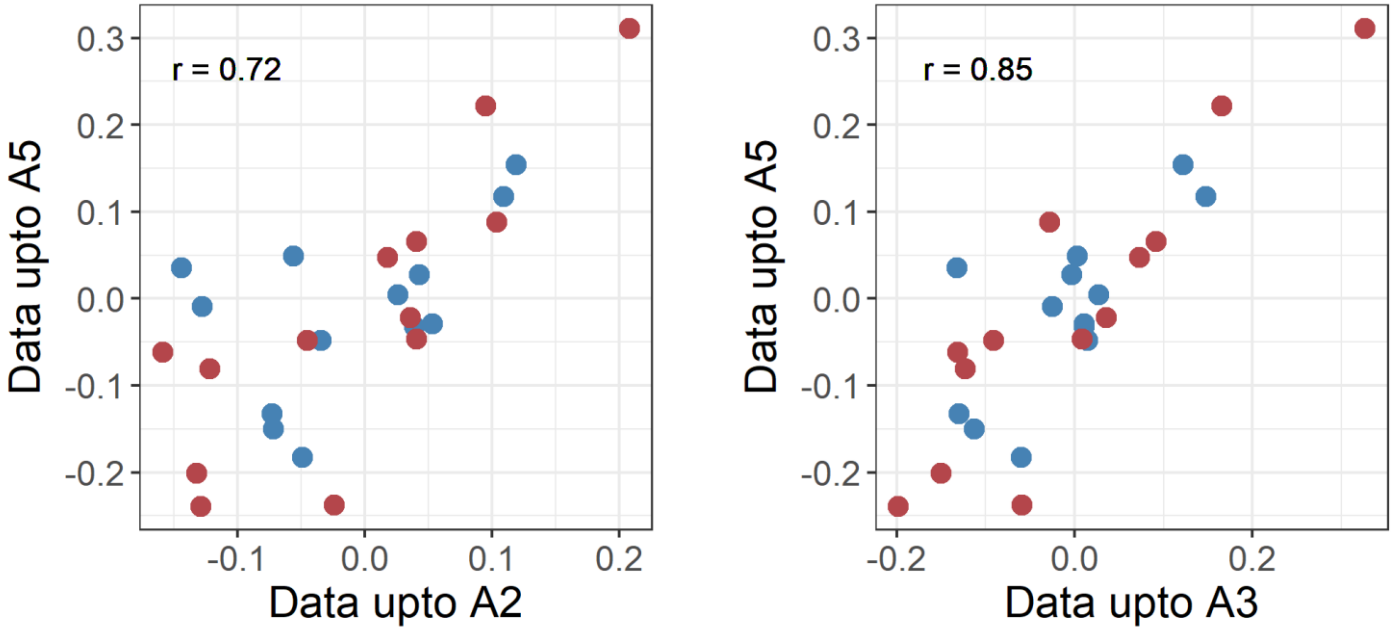
Source	Merino Ewe Genotypes
INF	4,353
Breeder & Resource Flock	13,335
MLP	5,250
Total	**22,938**

- Improved the accuracy of reproduction breeding values for important industry sires

	Progeny in MERINOSELECT	
	Pre-MLP	Post MLP
MLP Sires	9,000	70,000

Only MLP has **lifetime** reproduction data set

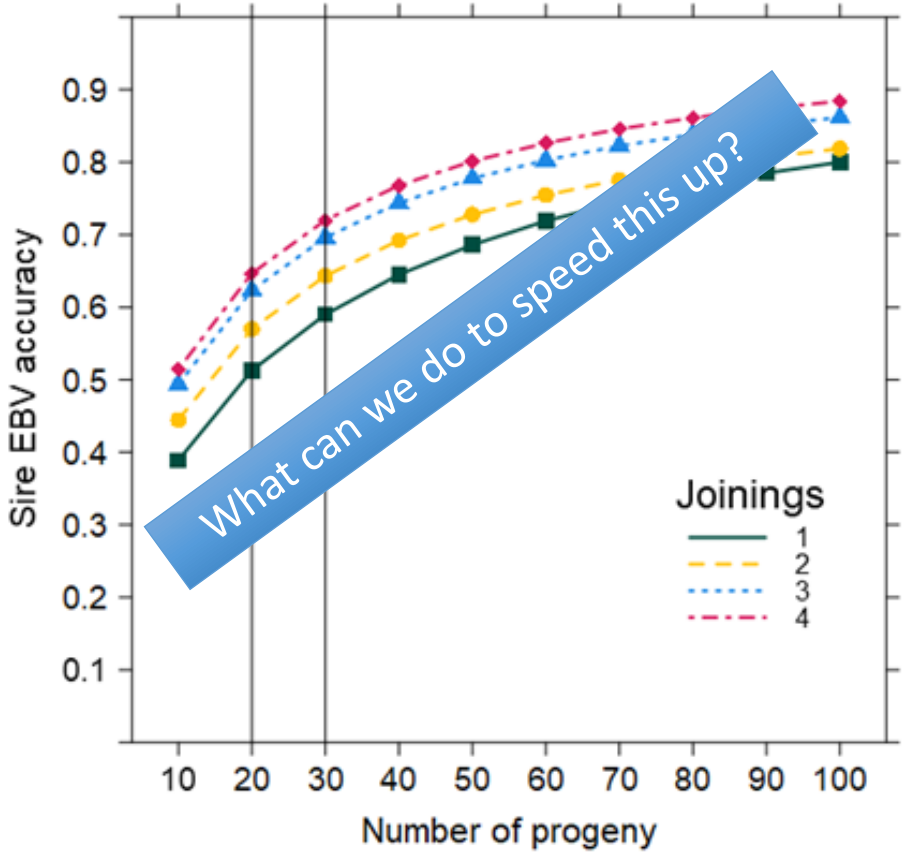
Weaning Rate FBV Over Time



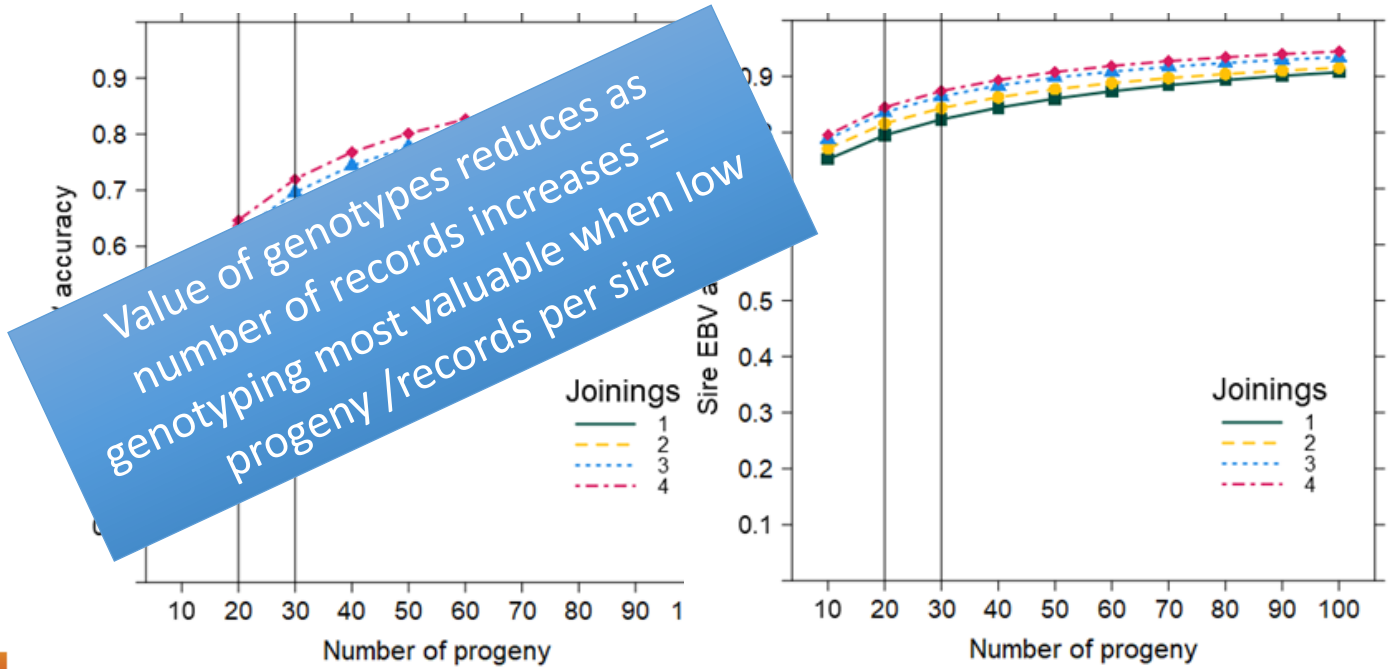
First lambing (maiden)

Two lambing events

Impact of Progeny Number?



Impact of Progeny Number + Genomics?



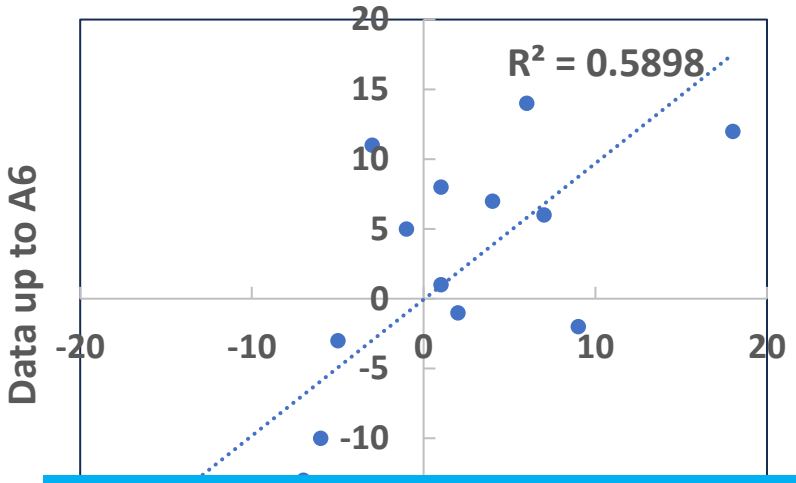
Take home

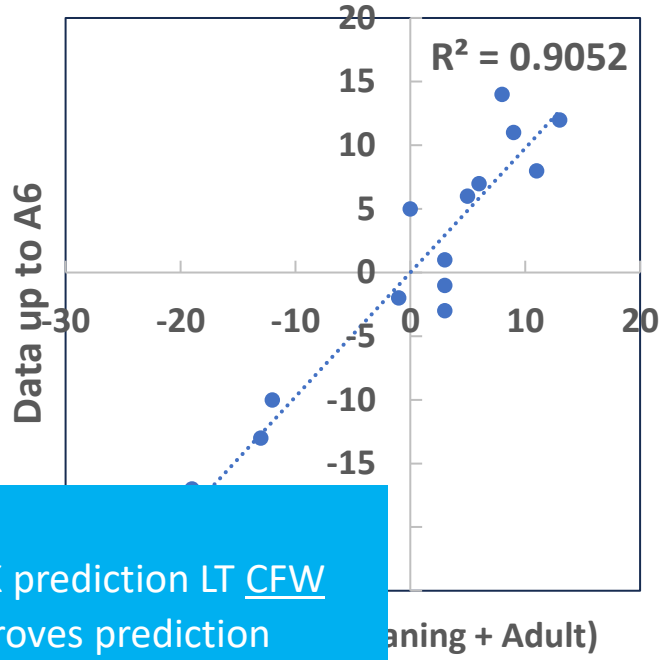
Weaning Rate accuracy improves with the number of progeny evaluated & repeat joinings

Genotyping increases the accuracy & reduces volatility of early Weaning Rate BVs

CFW FBV Over Time

Pingelly 2016 Drop





Take Home

- Evaluating ewes + rams at an early age = OK prediction LT CFW
- One extra H or A measurement greatly improves prediction

First Shearing

Second Shearing

Classing Insights

- Project classing results show classing aligns well with indexes prioritising fleece and growth

Pingelly 2016 Drop Hogget Classi… …etime Performance

HGRADE	Ave CFW…		…K	Ave WT%	Ave EMDmm	Ave WR	Final MP+
Top			0.5	102	-0.5	100	6.4
Flock		…0.1	-0.2	100	0.1	100	0.1
Cull		2.0	0.3	97	-0.4	102	-5.7
Total		**18.8**	**99**	**34**	**65**	**25**	**6.1**	**100**
Differe…	*…18*	*-0.7*	*-5.0*	*0.1*	*5*	*-0.2*	*-2*	*12*

Take Home

- Classers play a valuable role in selecting for productivity

MLP Analysis in Progress

Phenotypic & genetic relationships between:

- Lifetime wool production & quality
- Body composition
- Reproduction
- Visual traits + Classing
- Welfare & disease traits

Output will help us to:

Refine current genetic selection tools to breed Merino sheep that are more productive through life

What does it mean for you?

- You can have confidence in the accuracy of ASBVs
- Early measurements are good, an extra is better
- Classers provides a valuable role in selecting for productivity

So, what's on the horizon …

The latest tools and technologies to maximise gain

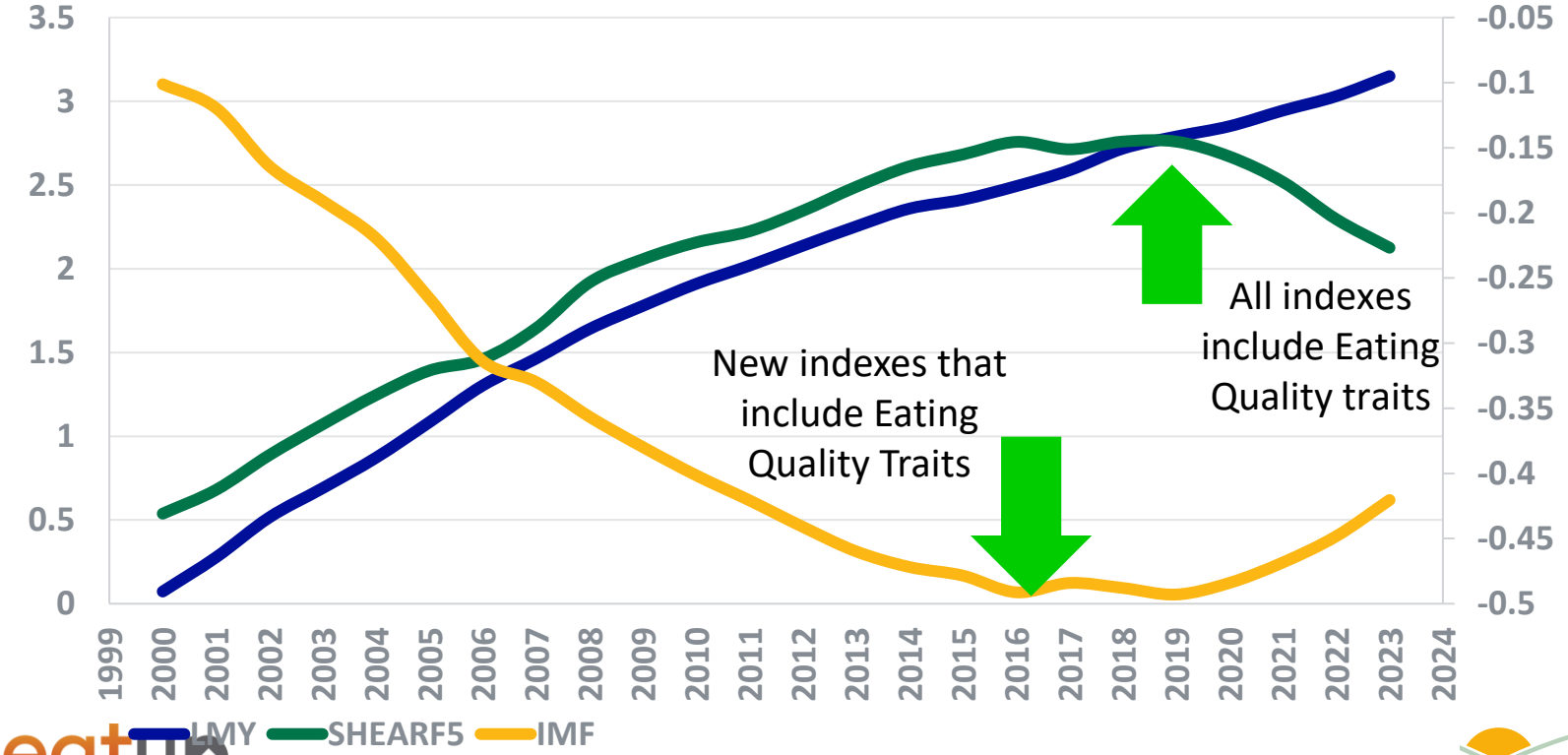
New traits

- Methane
- Eating quality

New Tools

- Combined LAMBPLAN analysis
- New genomic tools

What have we been able to do with ASBVs for Eating Quality (EQ) Indicator Traits?



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Future Eating Quality Traits

Intramuscular Fat (IMF)

Shear Force (SF5)

Consumer Satisfaction Australian Sheep Breeding Value (ASBV)

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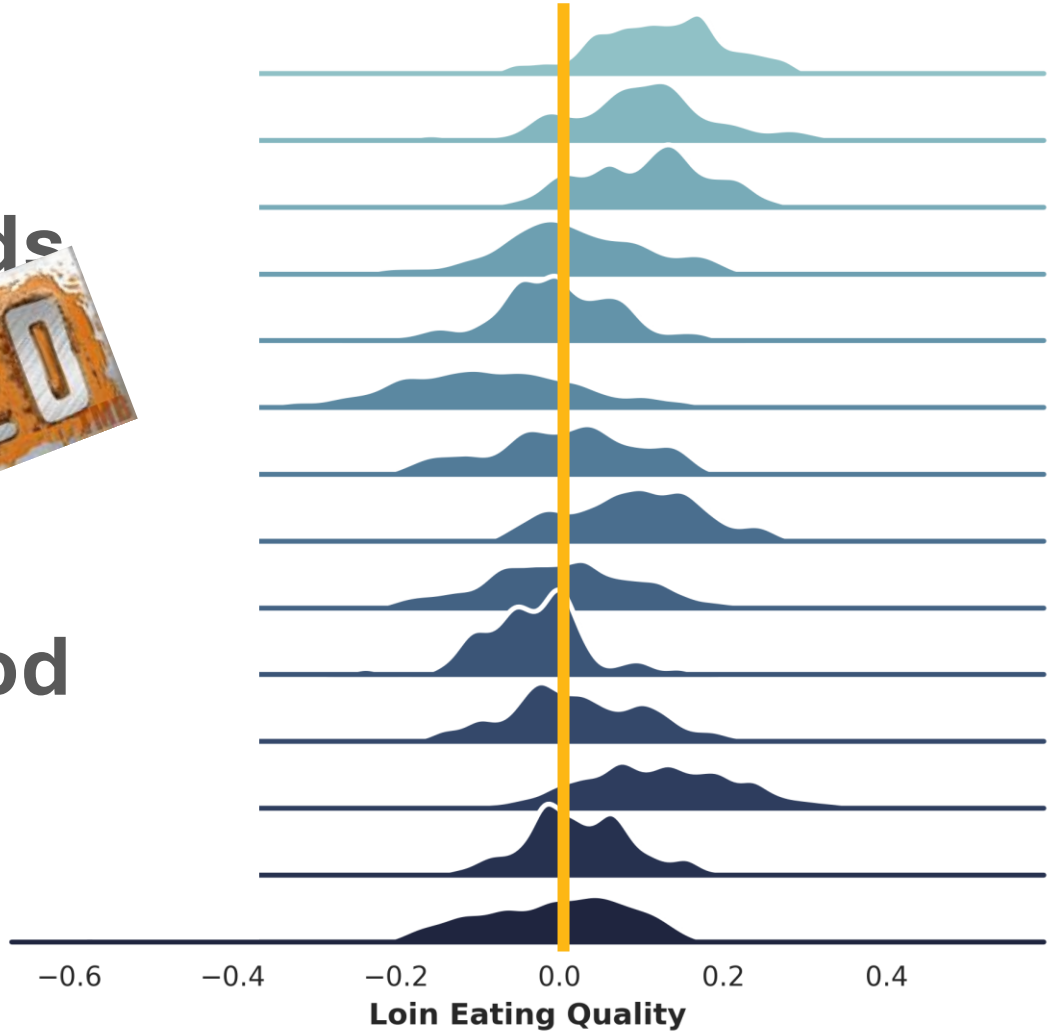
Myth: Some breeds are much bet… eating … from breed X I have good eating quality.



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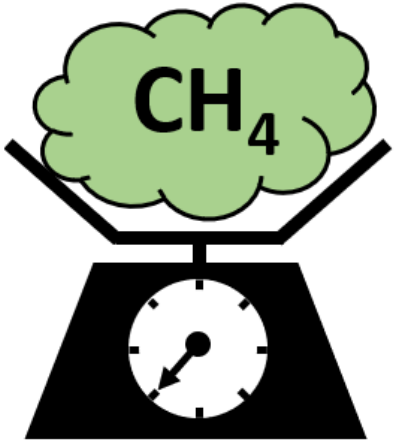
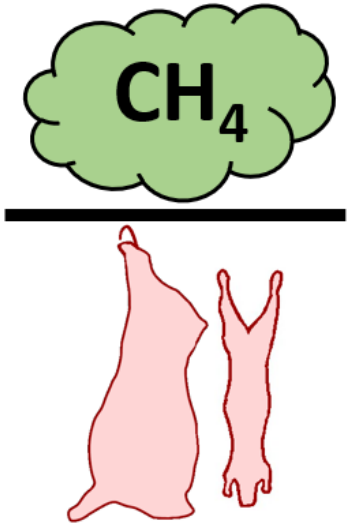
Breeding efficient animals



Methane
Production



Methane
Intensity

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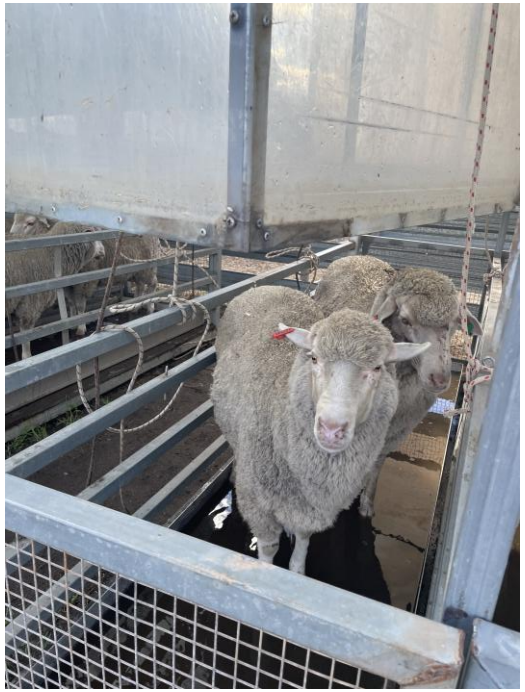
New Traits - Methane



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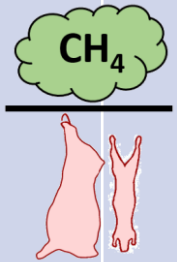
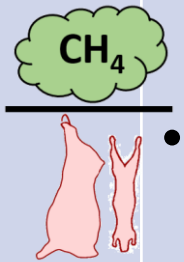
What about our current indexes?

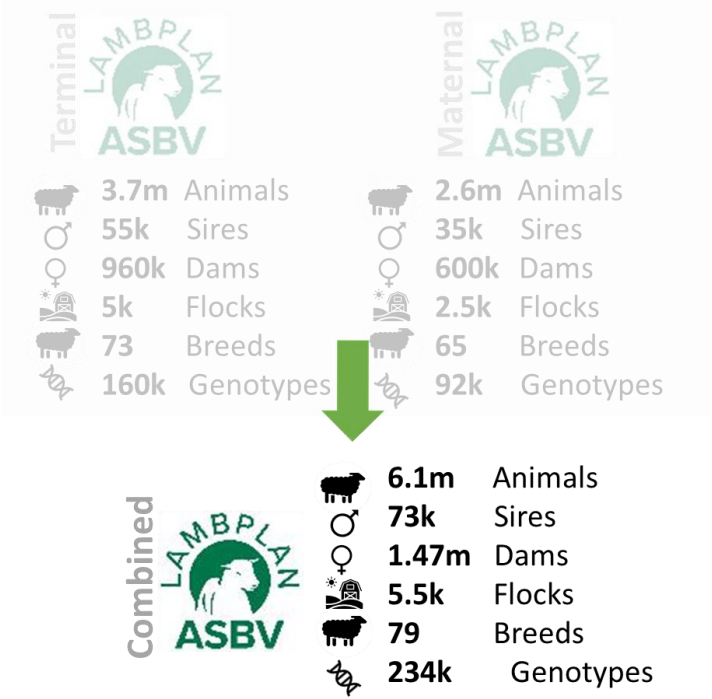
Terminal Sire Breeds	Maternal Sire Breeds	Merinos
• Faster growth • Improved Lean Meat Yield • Better Quality Meat	• Faster growth • Lower mature size • Improved reproduction	• Faster growth • Improved reproduction • Improved wool quality and quantity • Mature size?





A Combined LAMBPLAN Analysis

- Completely comparable ASBVs for Terminals and Maternals
  - Simplify for commercial ram buyers
- Research results available in 2025
- 2026 rams sales will be using the new analysis



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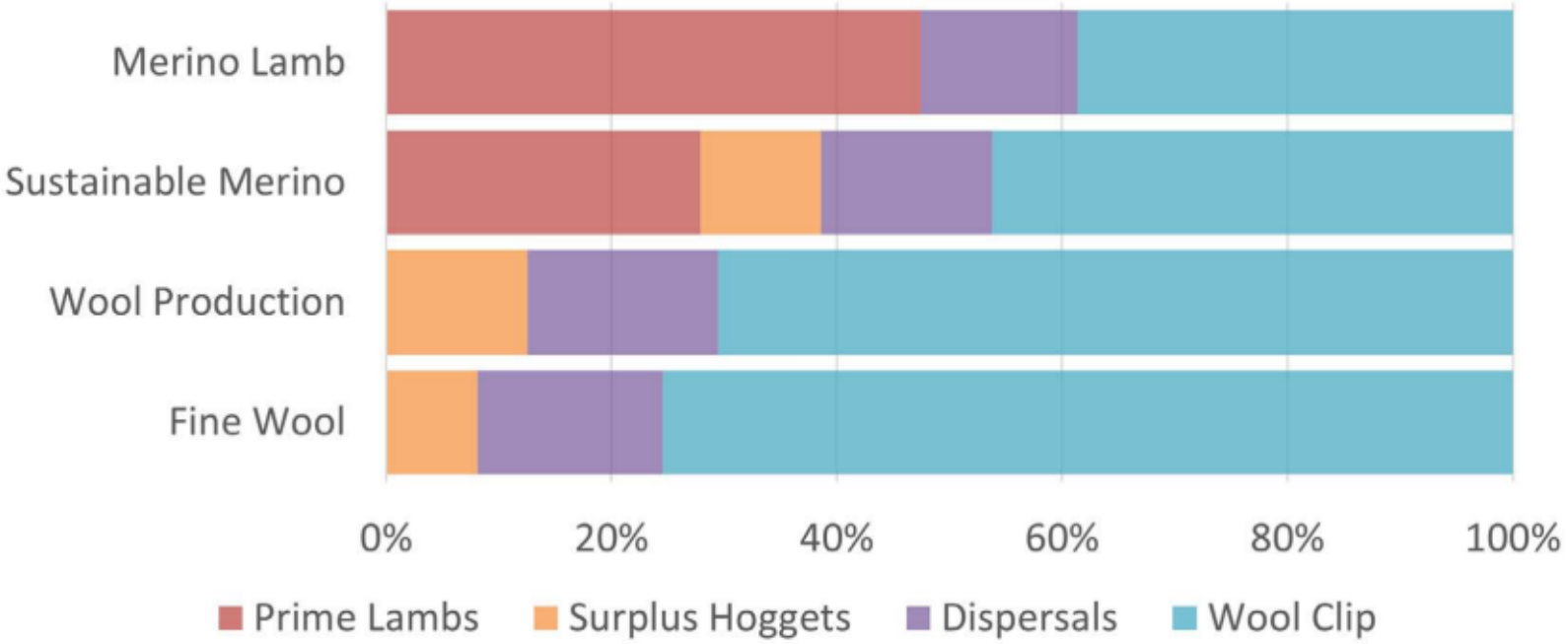
Merino Indexes



. Distribution of the production system income spread across sheepmeat sales from prime lambs, surplus hoggets and adult sheep dispersals, and from the total wool clip of the production system

The Sheep Genetics Offering is expanding

ASBVs and Indexes

- Across Flock Comparison
- Use to purchase rams/semen

Genomic Only Commercial Products (Merino)

- Within Flock Ranking Only
- Less information contributing
- Use to select rams (and potentially ewes)

Flock Profile (Merino)

- Flock level snapshot
- Not individual animal
- Use to help select rams to bring in

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Genomic Only Commercial Animal Products

C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
VID	ycfw	ycuv	ysl	pwt	ywt	yfat	yemd	DP	MP	FP	yfd	ydcv	ebwr	pfec
220143	1	8	9	8	8	8	9	8	4	6	6	10	10	1
220178	10	8	7	10	10	1	2	10	10	10	10	8	4	7
220076	6	5	4	10	10	2	4	10	9	8	7	1	9	3
220224	10	1	9	4	5	3	3	4	7	7	3	8	7	3
220043	8	2	8	10	10	3	4	10	10	10	5	10	10	3
220054	4	9	1	7	7	1	1	8	7	8	9	6	1	6
220187	7	4	7	2	2	1	3	4	8	9	10	8	3	8
220217	5	7	10	6	8	7	3	6	5	4	6	7	6	10
220124	7	1	8	2	2	3	2	2	3	4	2	3	5	5
220077	5	2	8	10	9	5	2	10	8	8	3	9	10	4
220139	9	2	3	9	8	1	3	10	9	8	3	4	1	2
220211	4	4	1	4	4	4	3	7	9	10	10	4	3	10
220182	10	2	2	8	7	6	4	7	9	9	6	6	6	7
220221	8	4	6	7	8	1	2	9	9	9	7	7	7	6
220045	6	8	10	5	4	2	5	4	5	7	5	10		
220069	8	5	4	9	8	3	4	9	9	8	3	9	4	3
220205	10	2	7	7	7	8	1	9	10	8	2	4	10	4
220006	7	5	9	10	9	1	1	9	9	10	8	10	7	7
220193	5	6	7	9	8	2	3	8	6	6	7	2	4	8
220006	7	5	9	10	9	1	1	9	9	10	8	10	7	7
220002	7	3	5	4	5	5	5	7	8	9	7	9	5	10
220149	3	10	1	2	4	6	7	5	6	8	10	2	2	9
220133	5	7	2	3	5	4	3	5	6	8	8	8	4	6
220164	10	2	8	7	7	1	2	7	6	3	1	1	7	3
220056	5	8	2	7	7	1	3	8	9	10	8	10	1	8
220078	10	3	3	2	2	3	4	4	10	10	9	1	1	8
220158	7	9	2	10	10	5	3	10	10	9	5	4	3	2
220023	3	7	7	10	10	4	7	10	7	7	8	4	5	4

ID	Fleece Weight	Index
220143	1	8
220178	10	8
220076	6	5
220224	10	1
220043	8	2
220054	4	9

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Merino Flock Profile

Client:
Date: 06/03/202
Flock Drop: 5 2022

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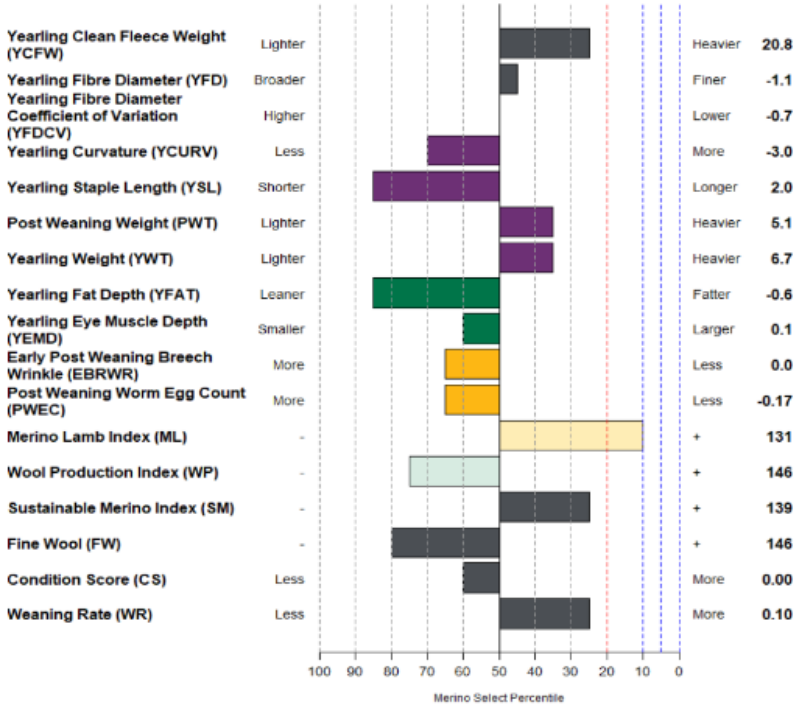
Flock Profile



Your Flock Profile values are displayed in the far right hand column. The diagram shows how your the flock compares to flock averages in the MERINOSELECT database. Note that the 100th percentile is the bottom value, 50th percentile is the average and zero percentile is top value of flocks in MERINOSELECT. If you do not see a bar for a trait or index, your Flock Profile sits in the 50% percentile. To achieve gain in desired traits or indexes, select rams with ASBVs higher than your Flock Profile value. Results are subject to change slightly as predictions update over time.

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3.4 What about the future of these products

ASBVs and Indexes

- 2027 there will be just 2 evaluations
- Latest and new BVs

Genomic Only Products

- Will be expanded to new breeds

Fock Profile

- Will be expanded to new breeds

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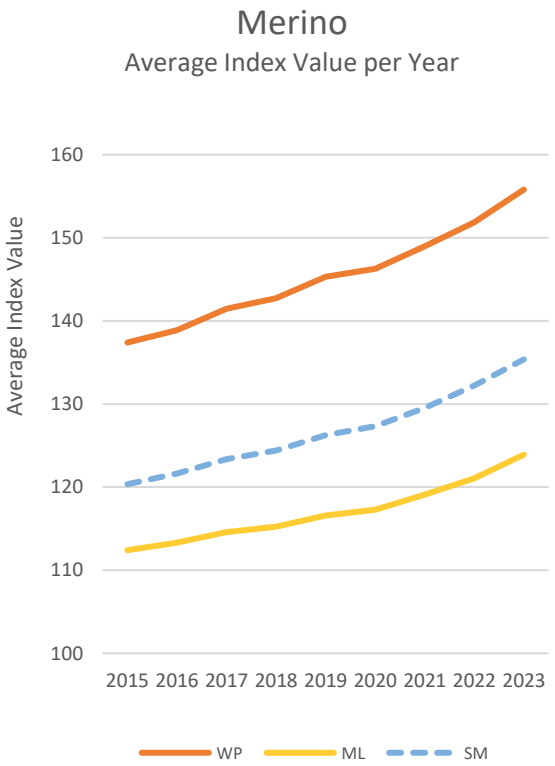
What can you do now!

1. Have a breeding objective
2. Purchase rams with a ASBVs and Indexes
3. Use available tools
4. TRACK YOUR RAM TEAM!



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Key Take Homes

1. Consider the future state and make selection decisions now that set your business up for success

2. A combined LAMBPLAN evaluation is part of the journey to enable genetic products for all breeds for a range of traits

3. There are a suite of genetic products available for all businesses – ASBVs, Genomic Only Breeding Values, Flock Profile and ram team tracking

Tools and resources

Coming in 2026 - MLP Project Site Workshops

Subscribe to the MLP newsletter@
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Subscribe to all AMSEA and MLP updates@
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Stay up to date: Sheep Genetics Monthly Update Email

MLP Acknowledgements

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Thanks especially to the site partners and hosts.