nextgen AGRI

Breeding for more lambs.

Session 1.

About Us

Dr Mark Ferguson
CEO, neXtgen Agri

Dr Gus Rose
Manager, Sheep Genetics

The plan

Build awareness of potential strategies to make genetic gain for ewe reproduction and lamb survival

Producer Demonstration Site Project

- 8 sites over 5 years
- Comparing the outcome from selecting rams with superior reproduction with ‘normal’ rams
- Opportunity to get involved

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The plan

Session 1. The repro breeding values

Session 2. Buying rams for repro
(Wednesday 4th)

Session 3.
Strategies for ewe selection
(Wednesday 11th)

mla
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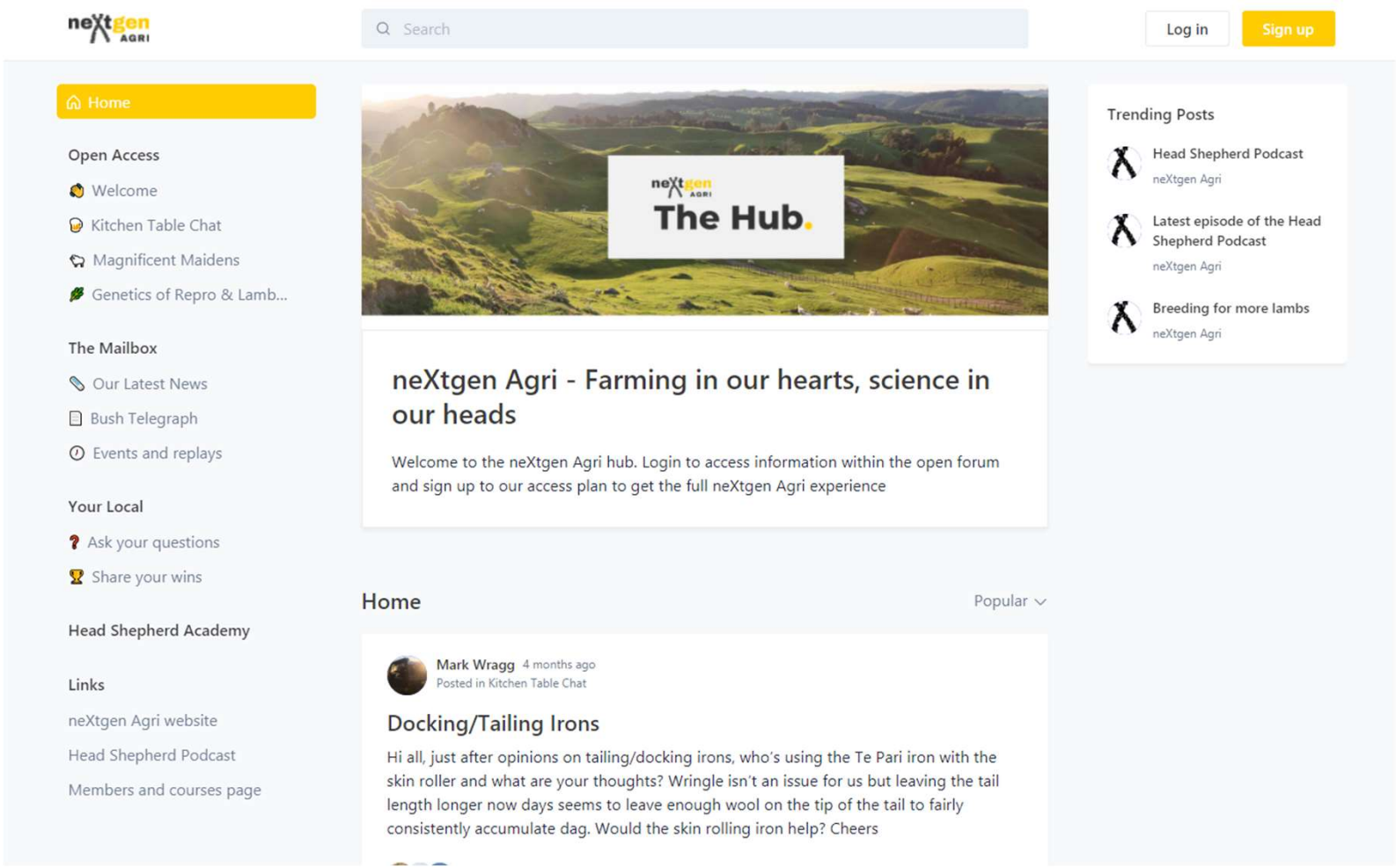

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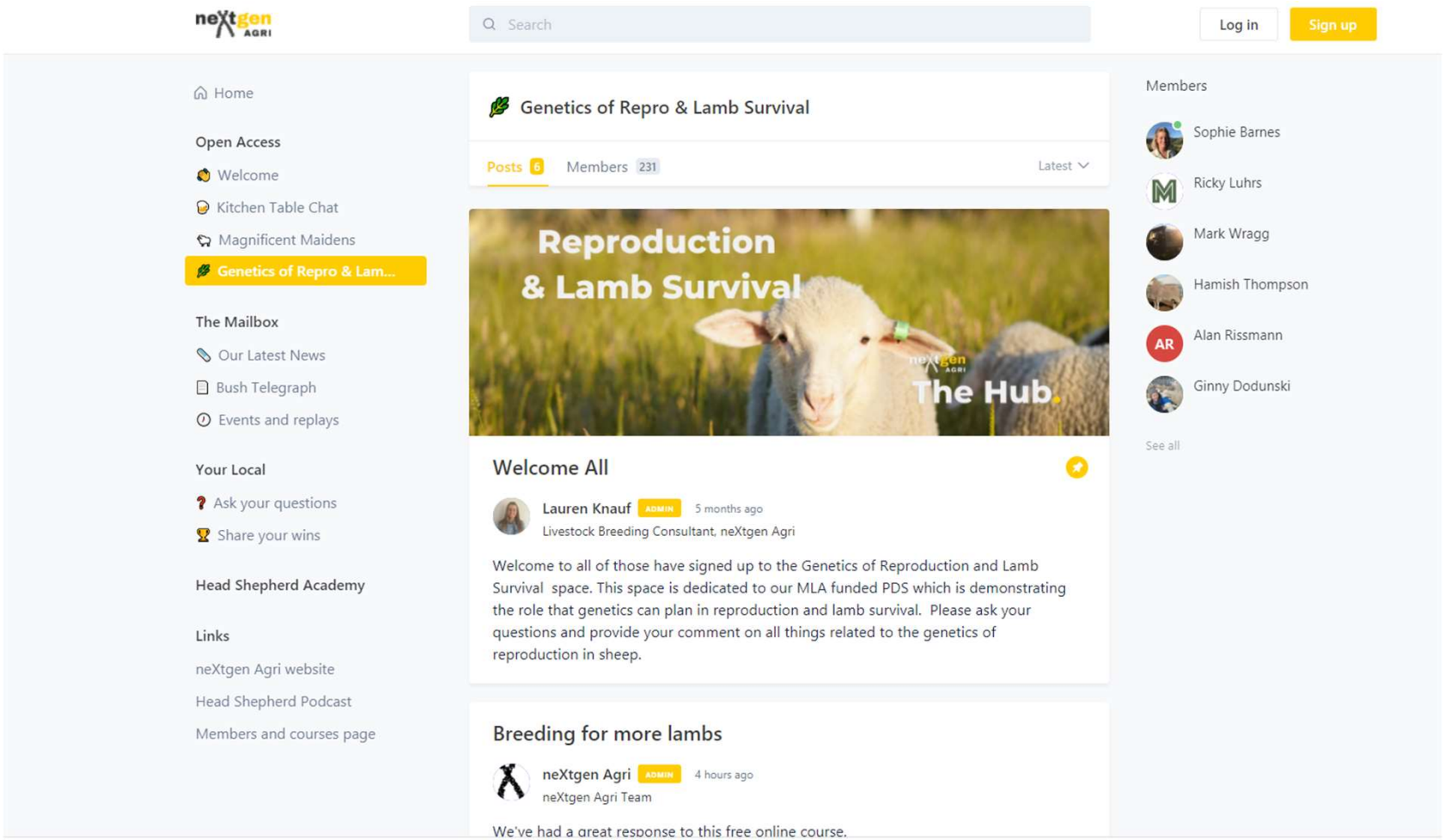

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Answers and questions...

Error is the enemy of genetic gain.

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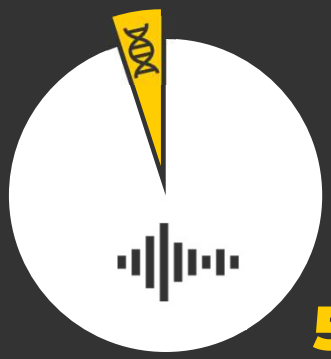
Understanding heritability.

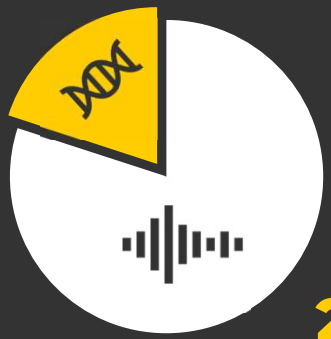
The proportion of the variation between individuals that can be explained by genes

Understanding heritability.



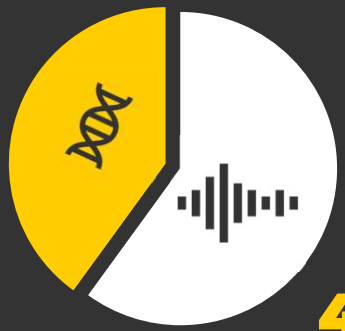
5%

Reproduction



20%

Resistance to worms



40%

Growth

55%

Fibre diameter

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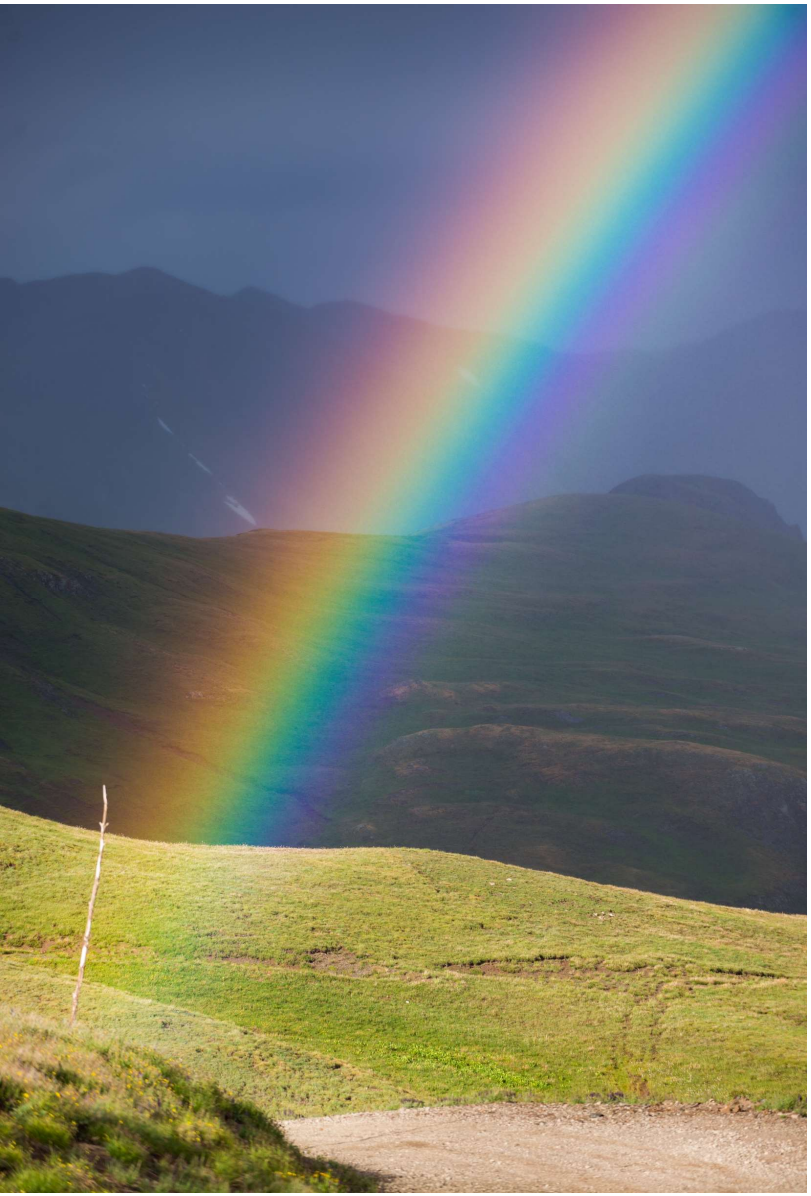
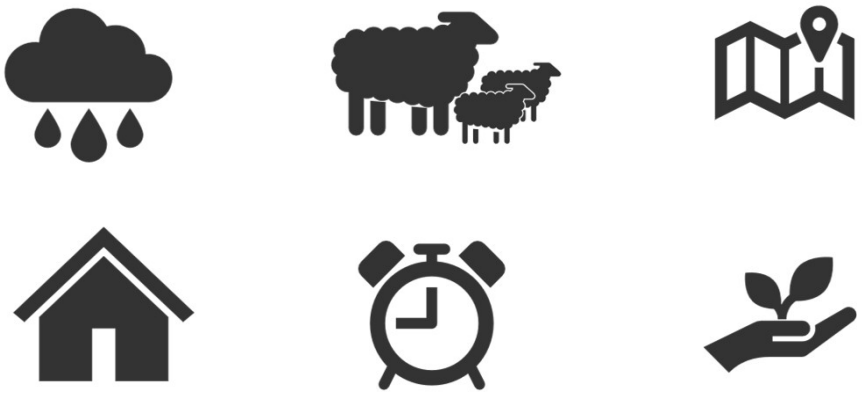
What are your sources of error?

- Ram selection
- Ewe replacements
- Adult ewes



Most of what we see is not due to genes.



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What is in a breeding value?

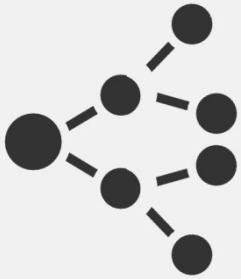
Measure the trait

Nutrition

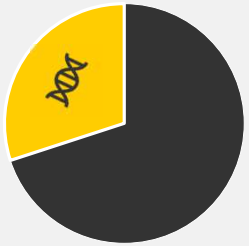
Management

Age of the animals dam

Single, twin or triplet



Pedigree



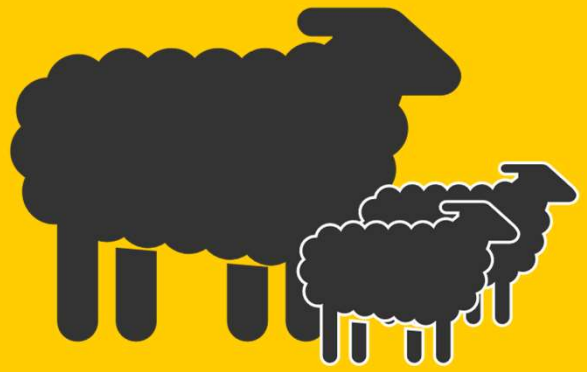
Heritability of the trait

Correlated traits

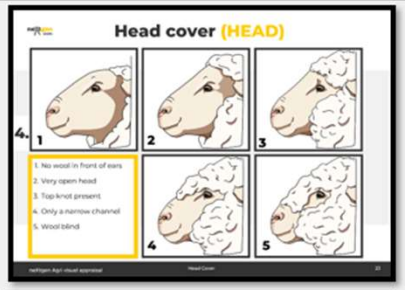
Time to chat

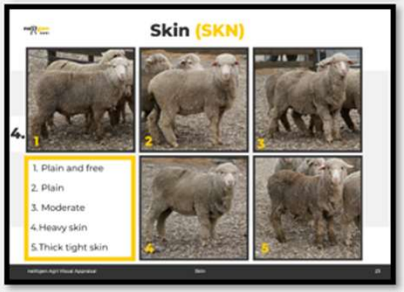
- Where you farm and what type of sheep
- Are you making genetic gain for ewe repro and lamb survival?
- How do you know?

The reproduction breeding values



Homework: Repro evaluator





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Ram team reproduction potential evaluator

Breed of rams	
Do your rams have Breeding Values?	
Average head cover score	
Average skin score	
Average scrotal circumference	
Birth type of rams	
How do your rams fare for NLW BVs?	
Do your rams have a CON breeding value?	
Do your rams have an LS breeding value?	
Do your rams have an ERA breeding value?	
How do your rams fare for FAT BVs?	
How do your rams fare for EMD BVs?	
How do your rams fare for WT BVs	
Total score	

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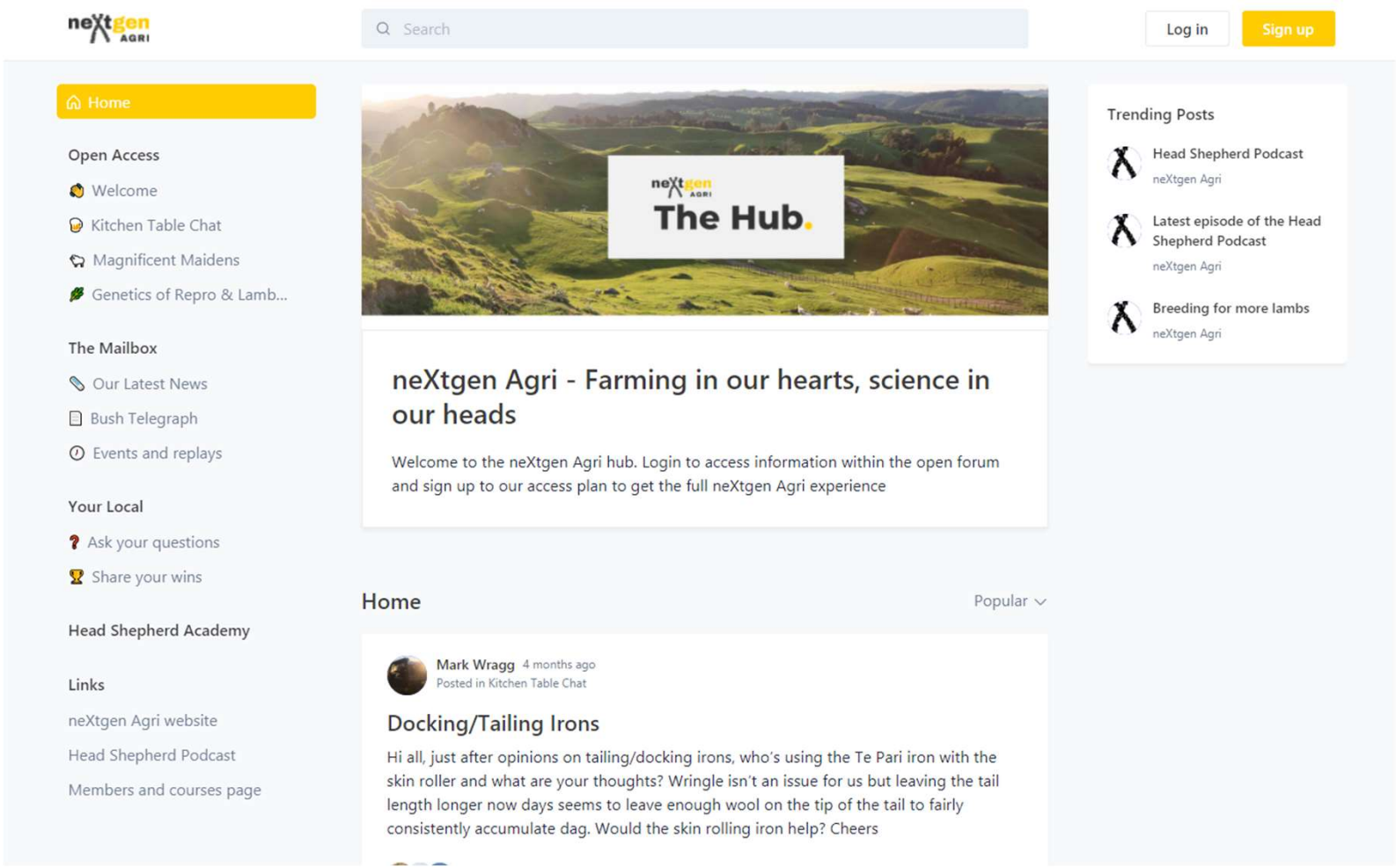

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Questions

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- Want some support to buy rams with greater reproduction potential?
- Free support from the neXtgen team in defining which rams to buy and evaluating their progeny
- 5 opportunities
- See you next Wednesday at the same time

Breeding for more lambs.

Session 2.

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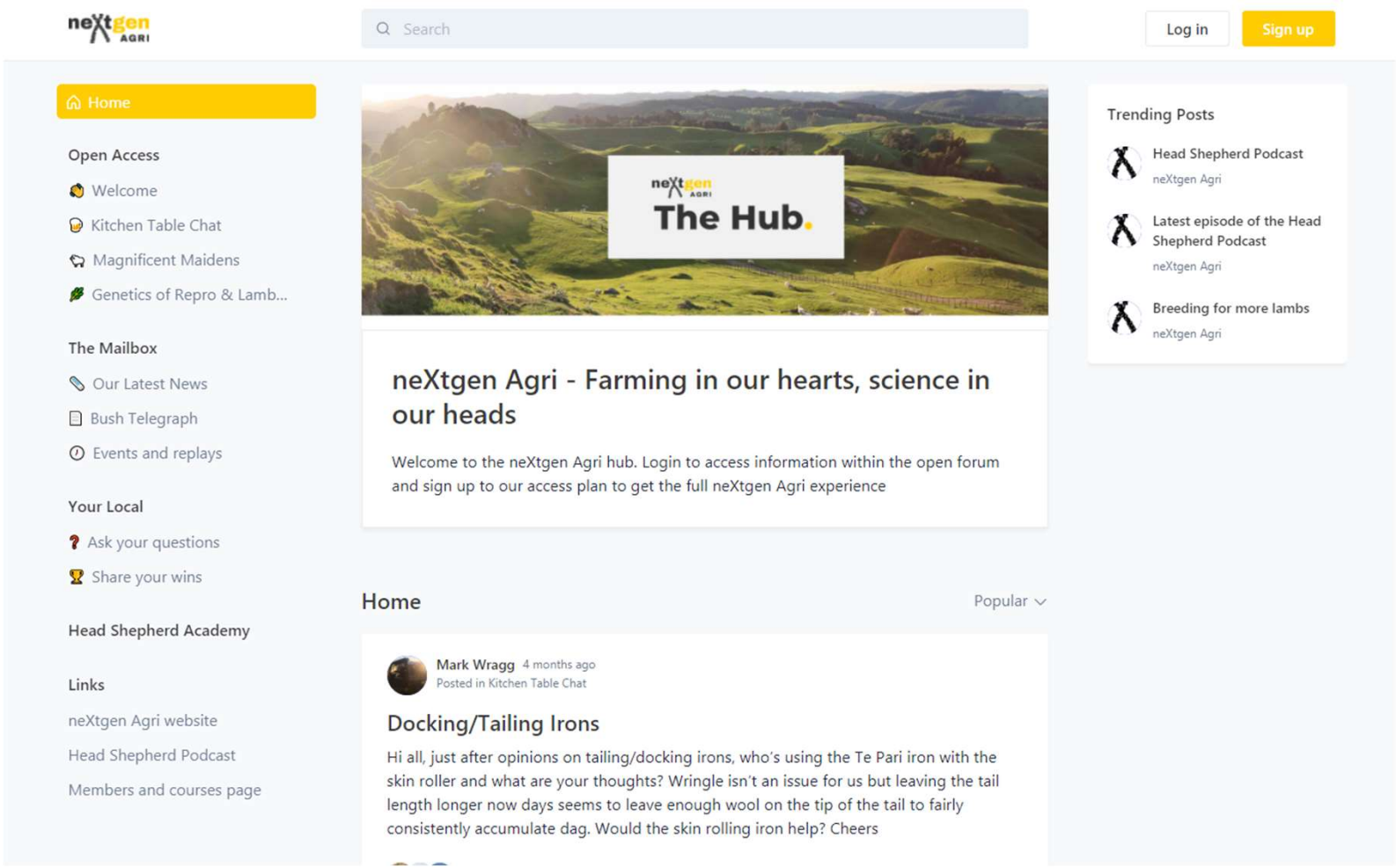

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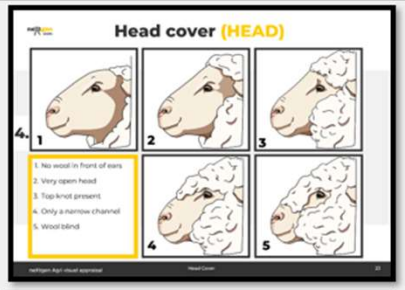
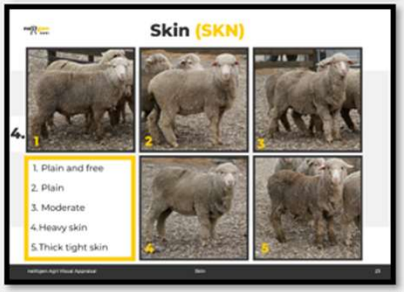
Homework: Repro evaluator





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Ram team reproduction potential evaluator

Breed of rams	
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Average head cover score	
Average skin score	
Average scrotal circumference	
Birth type of rams	
How do your rams fare for NLW BVs?	
Do your rams have a CON breeding value?	
Do your rams have an LS breeding value?	
Do your rams have an ERA breeding value?	
How do your rams fare for FAT BVs?	
How do your rams fare for EMD BVs?	
How do your rams fare for WT BVs	
Total score	

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Time to chat

- Did you have a think about your current ram team?
- What did you discover?
- What would you do differently?

Ram buying, you are likely either:

- Happy with your ram breeder and have access to all of the info you need
- Happy with your ram breeder but need more info to select between rams – but will stay
- Happy with your ram breeder & need more info so will look for a new ram breeder
- Looking for a ram source that has the type and info you need

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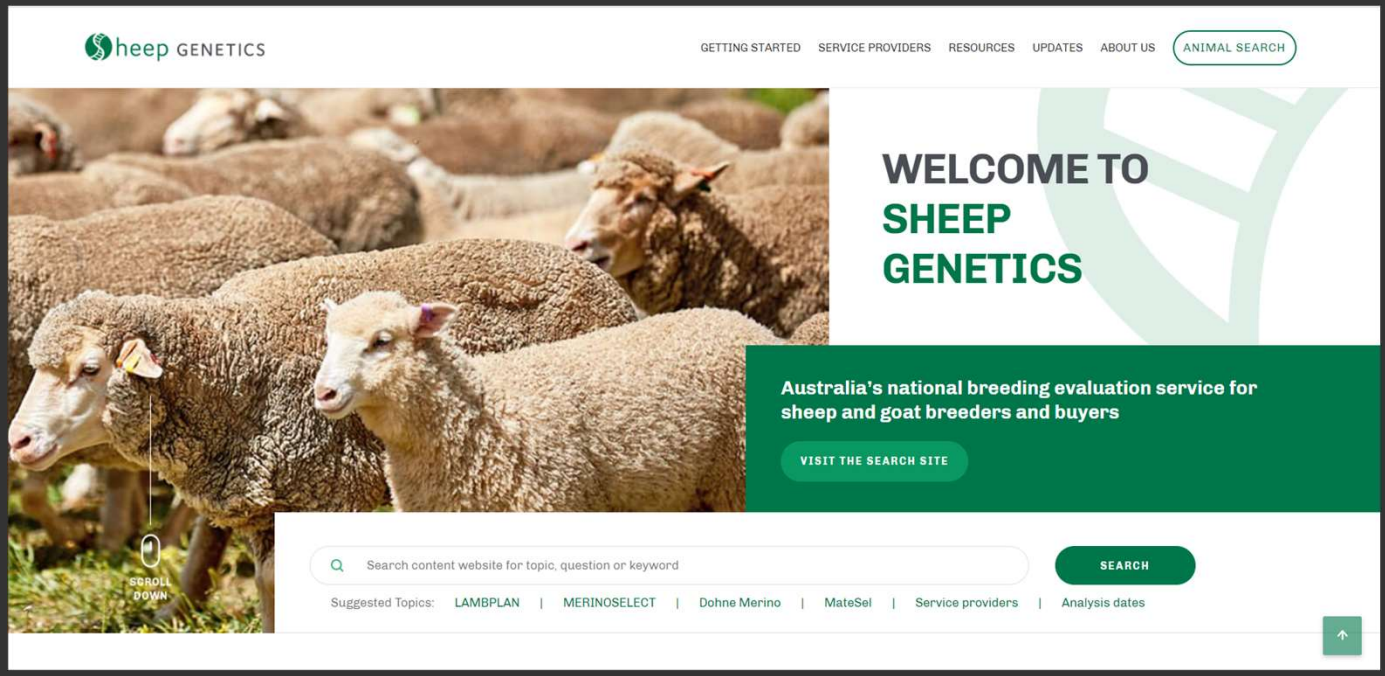
Sheep Genetics website



www.sheepgenetics.org.au

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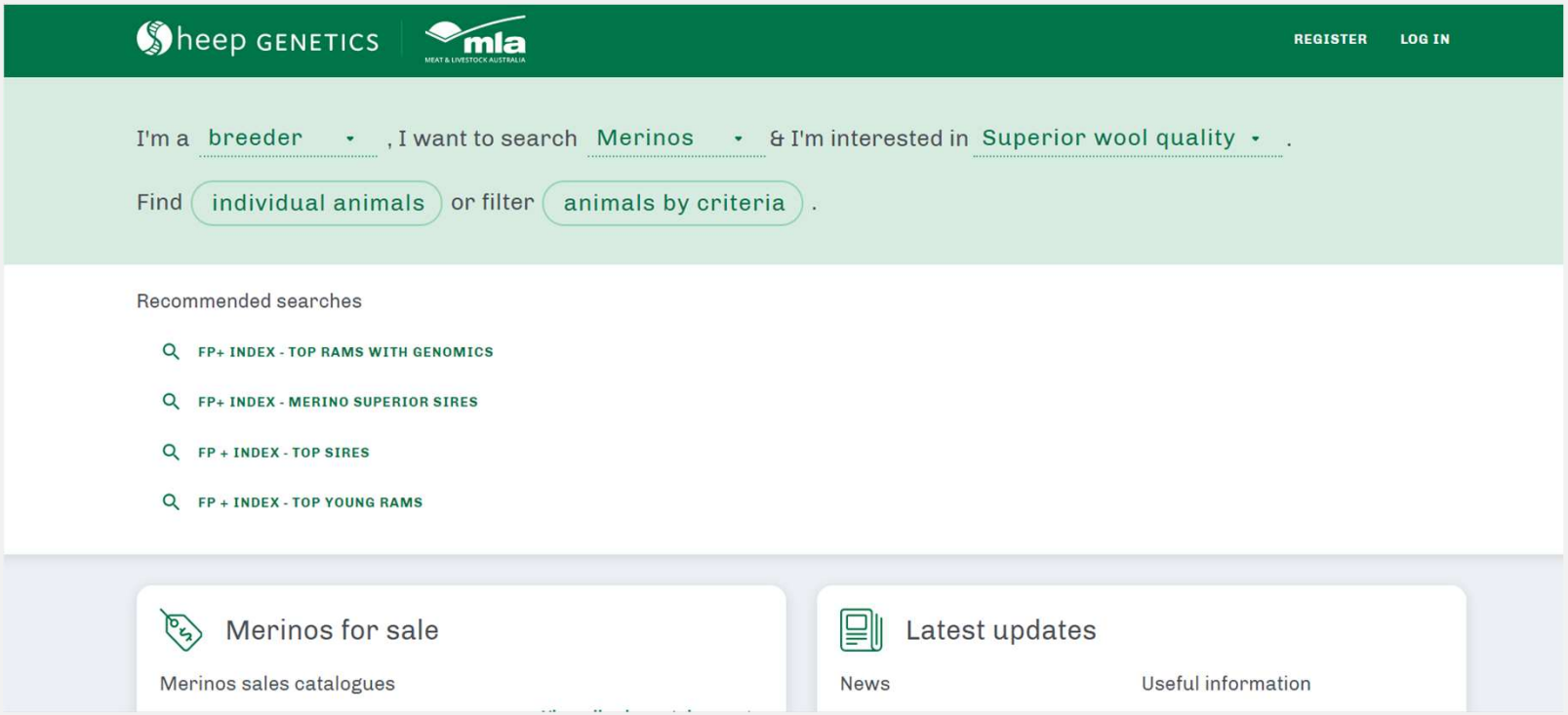
Ram hunting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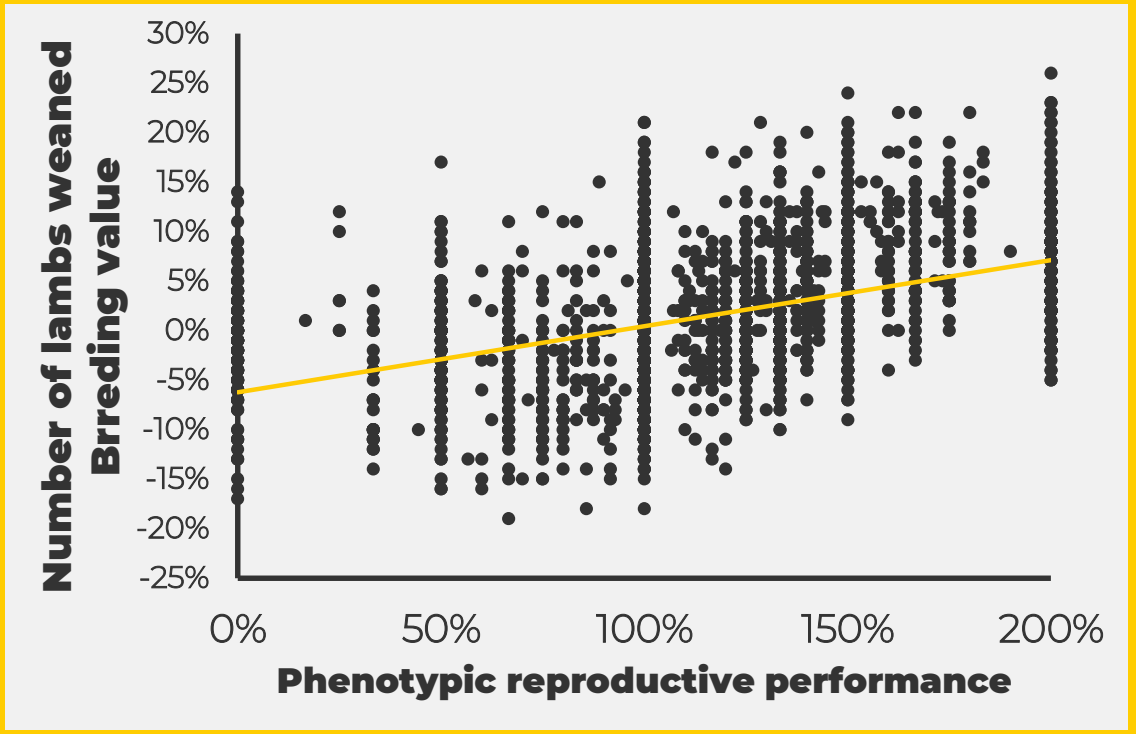
I'm a breeder , I want to search Merinos & I'm interested in Superior wool quality .
Find individual animals or filter animals by criteria .
Recommended searches
FP+ INDEX - TOP RAMS WITH GENOMICS
FP+ INDEX - MERINO SUPERIOR SIRES
FP + INDEX - TOP SIRES
FP + INDEX - TOP YOUNG RAMS
Merinos for sale
Merinos sales catalogues
Latest updates
News
Useful information

No repro BVs – what can I do?

Selecting on twins?

- Buying twin born rams can help
- Buying on the repro breeding values is so much better



What is correlated with repro?

Weaning weight	**0.52**	
Hogget weight	**0.46**	
Fat Depth	**0.32**	
Eye Muscle Depth	**0.46**	
Breech Wrinkle	**-0.43**	*
Face Cover	**-0.48**	*
Pre-joining weight	**0.50**	*
Pre-joining condition score	**0.41**	*

Merinotech WA Data, * data from Daniel Brown, AAABG 2017

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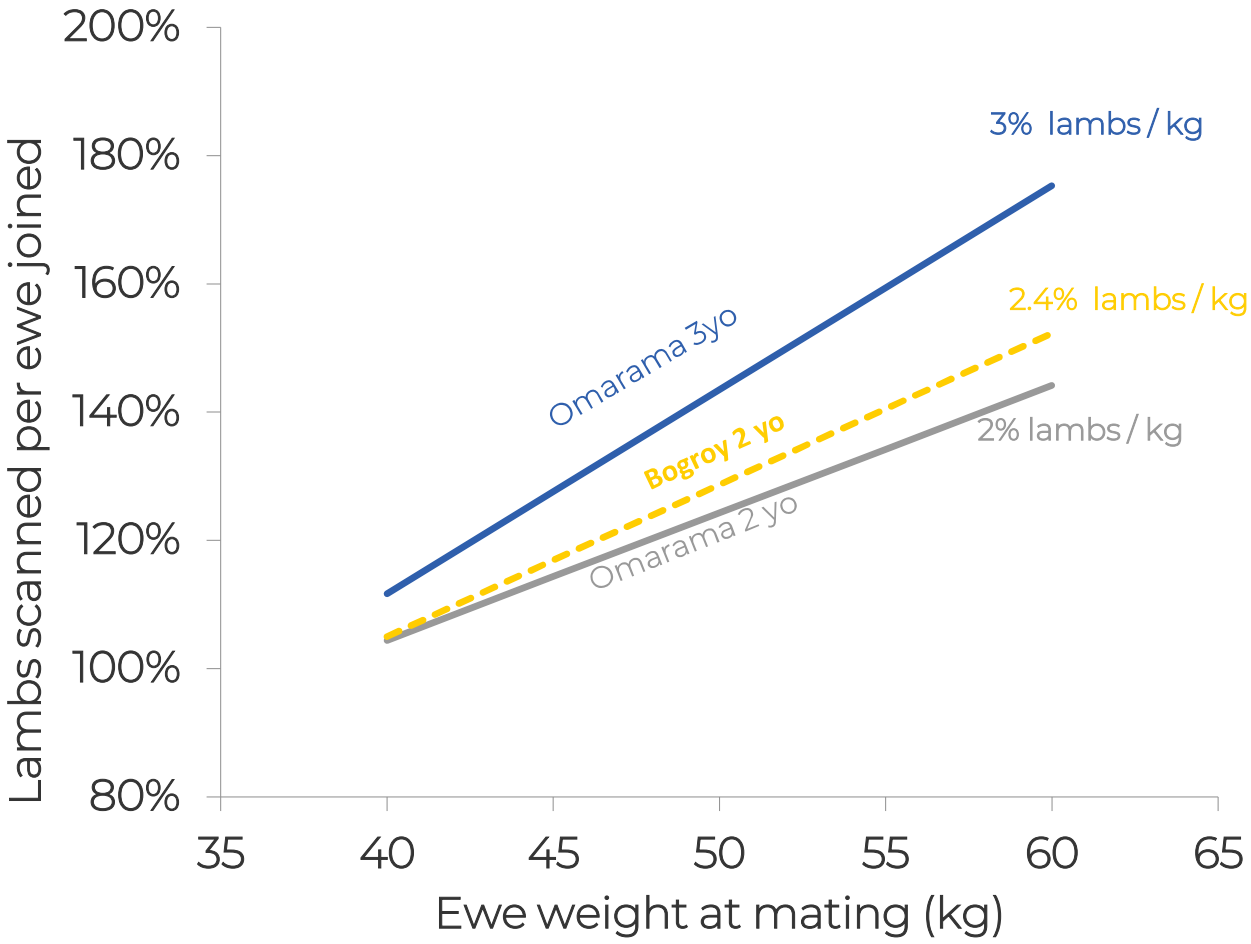
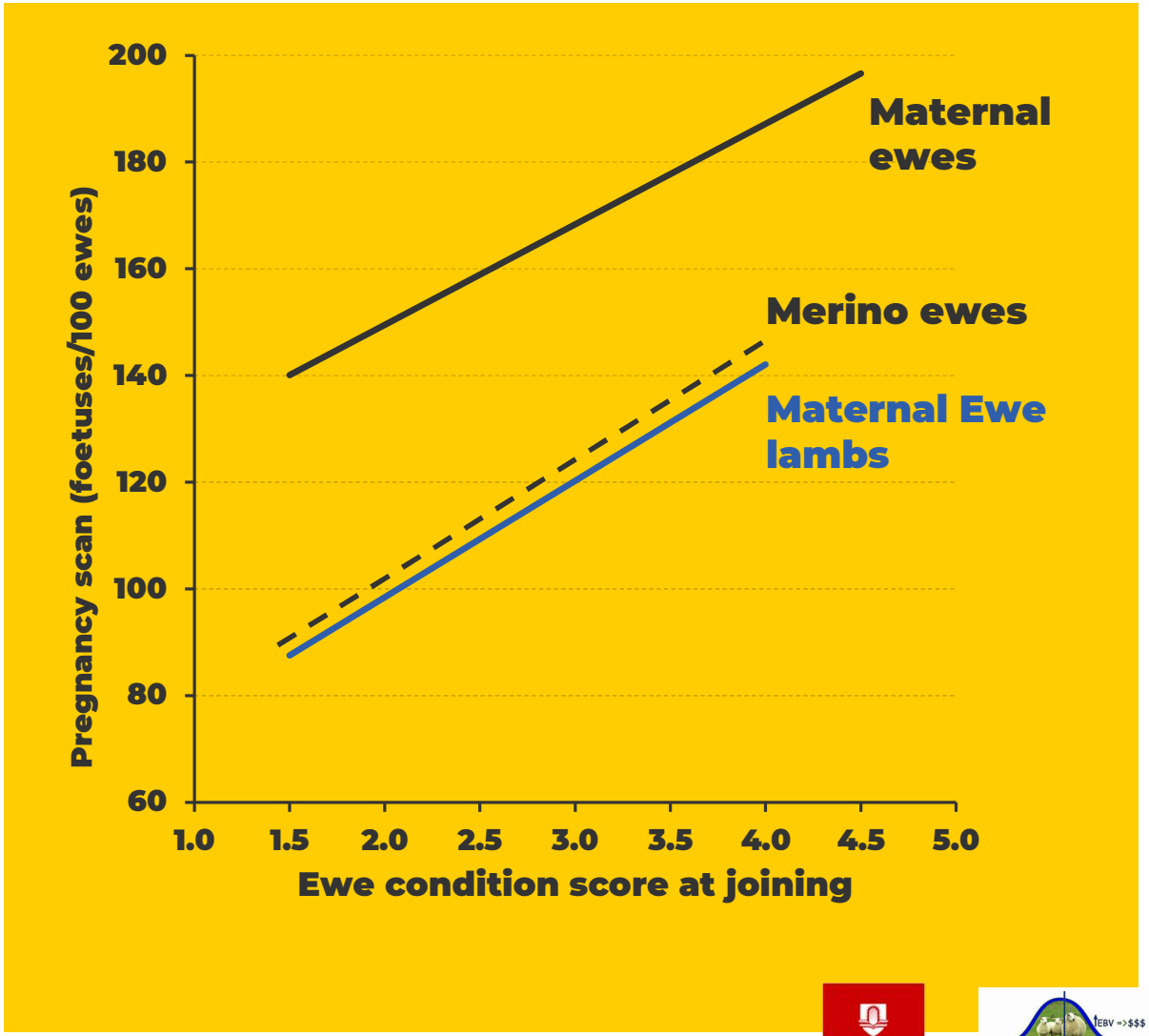

200%
180%
160%
140%
120%
100%
80%
Lambs scanned per ewe joined
35
40
45
50
55
60
65
Ewe weight at mating (kg)
3% lambs / kg
2.4% lambs / kg
2% lambs / kg
Omarama 3yo
Bogroy 2 yo
Omarama 2 yo



Better condition, more lambs

- Adapted from Ferguson et al. 2011
- Lifetime Wool Project
- Thompson (unpublished)

Murdoch University

Cashmore Oaklea Performance Maternals

awi Australian Wool Innovation Limited

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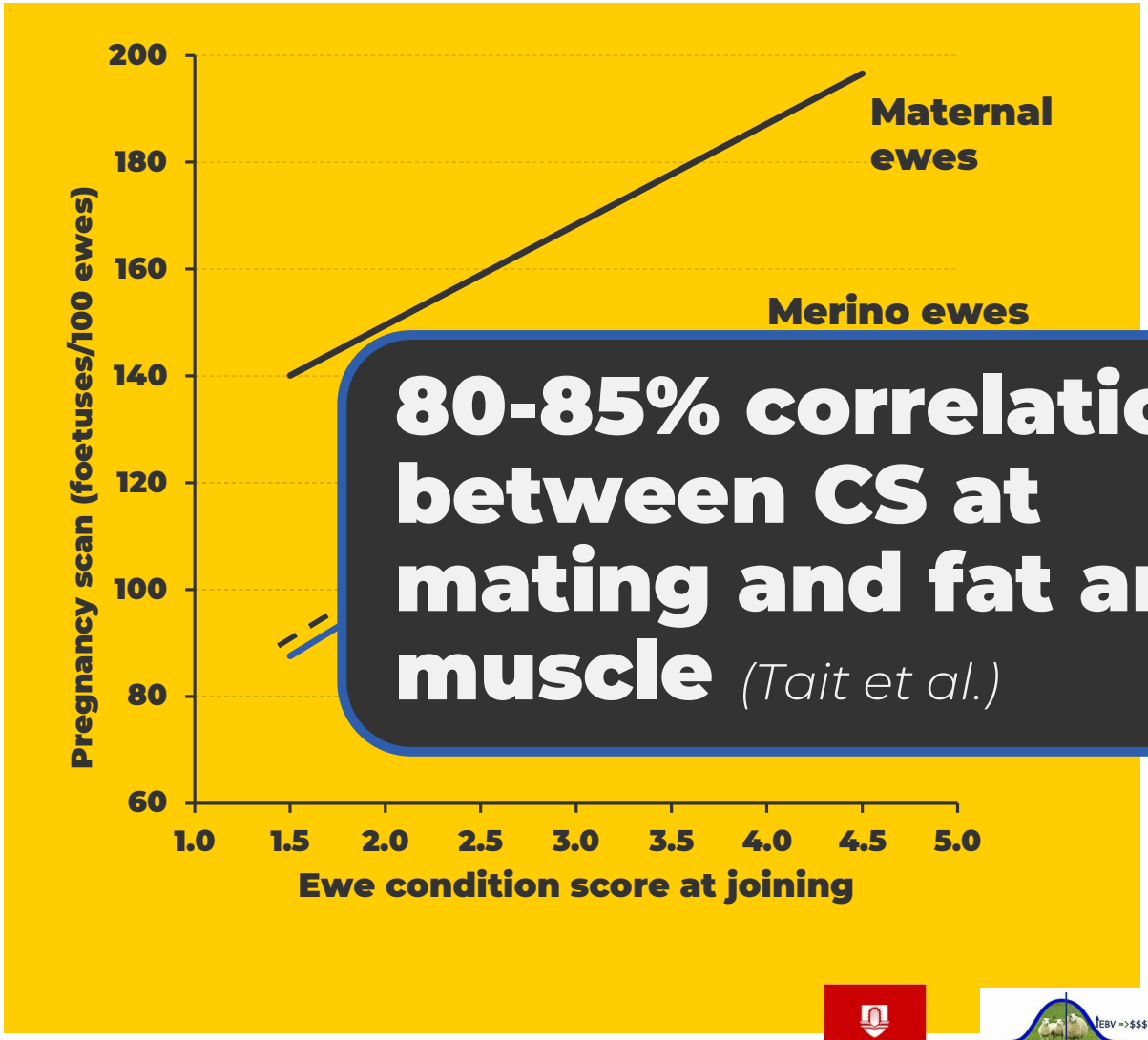
Better condition, more lambs



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Cashmore Oaklea Performance Maternals

EBV =>$$$

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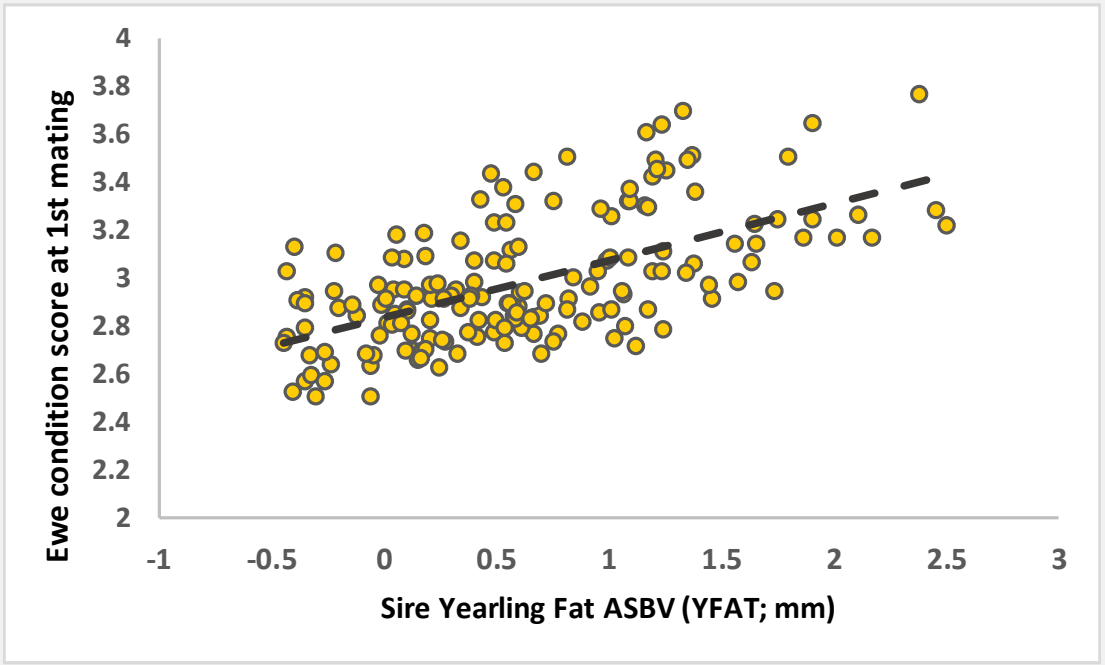
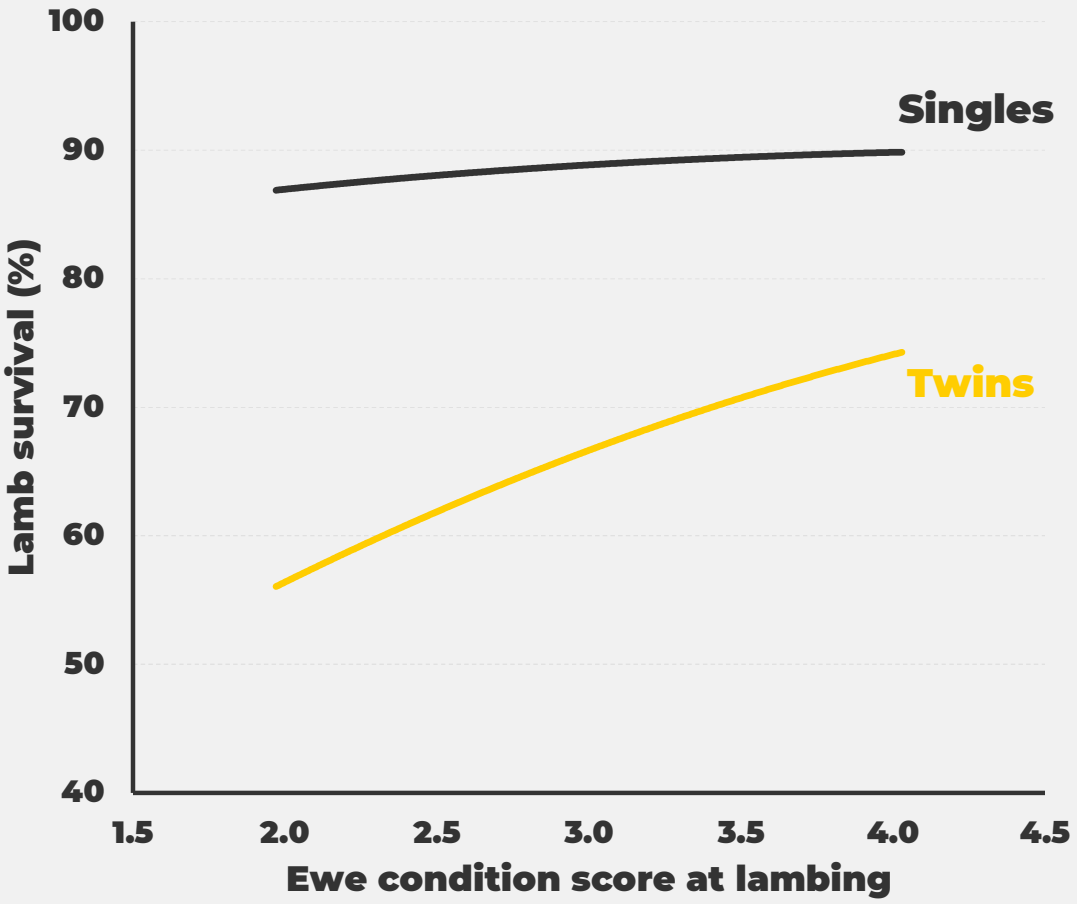


Condition score

- **cs** – Condition score
- New breeding value
- Closely correlated to both muscle and fat



Ewe CS drives lamb survival

- Lifetime wool merino data
- Thompson unpublished

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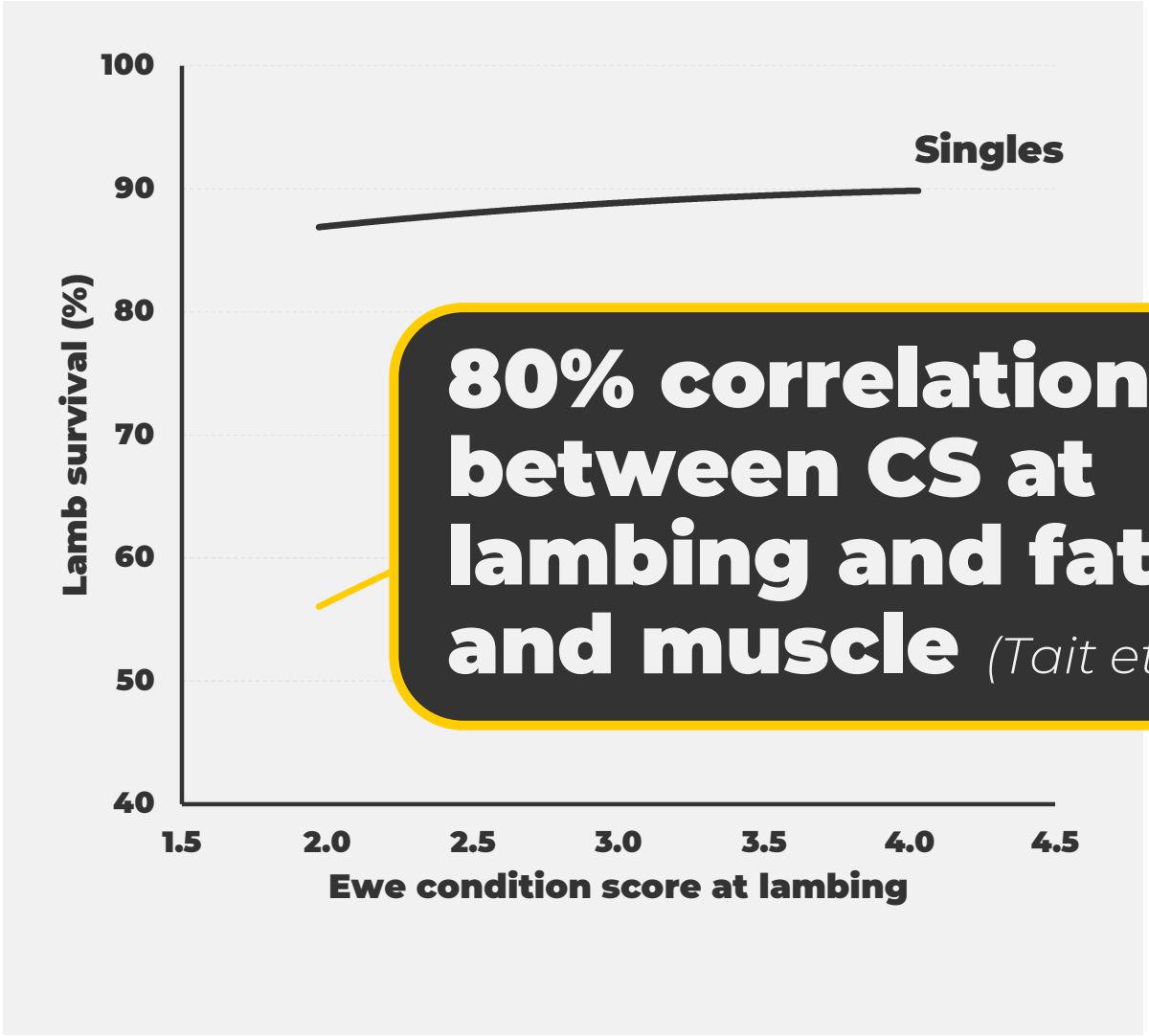

80% correlation between CS at lambing and fat and muscle *(Tait et al.)*

Ewe CS drives lamb survival

time wool merino data

mpson unpublished

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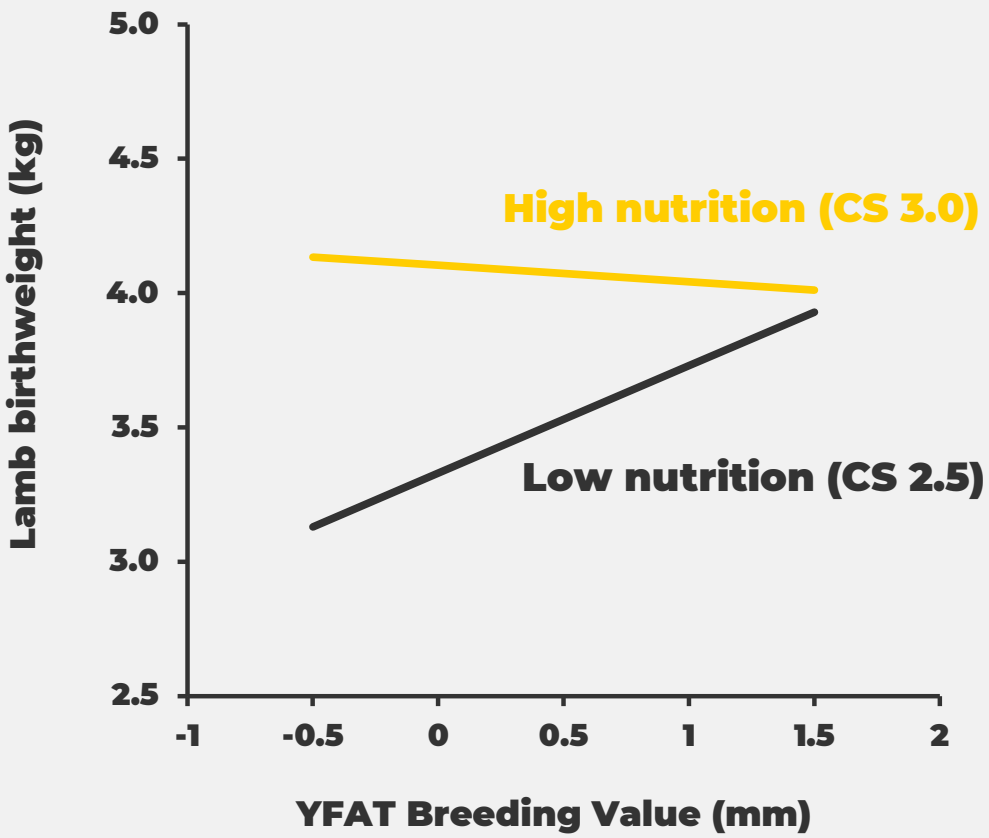

Fit lambs from fat ewes

- YFAT in the ewe producing lambs with higher birth weight
- Maiden merinos
- Merinotech WA
- Ferguson PhD

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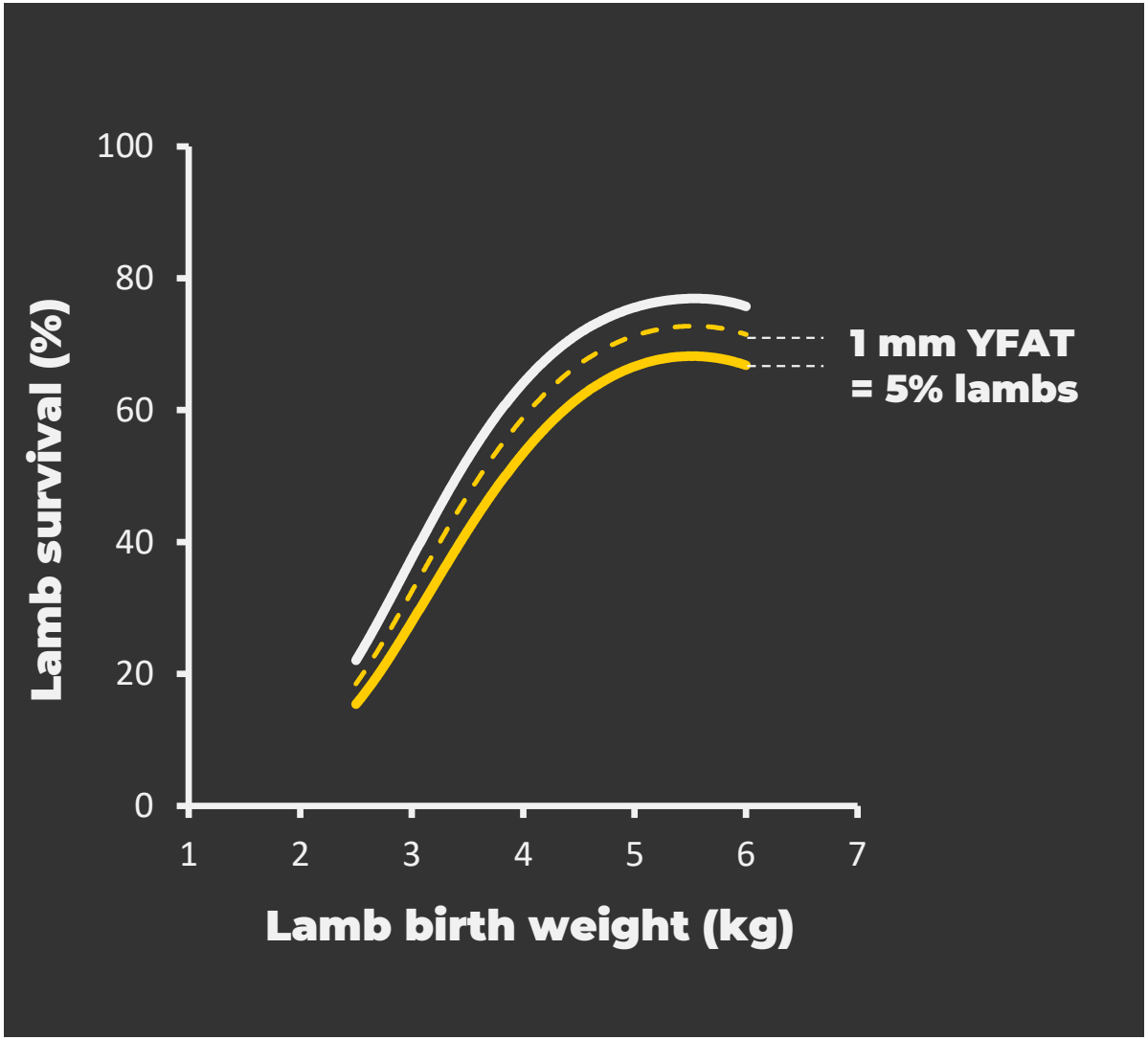
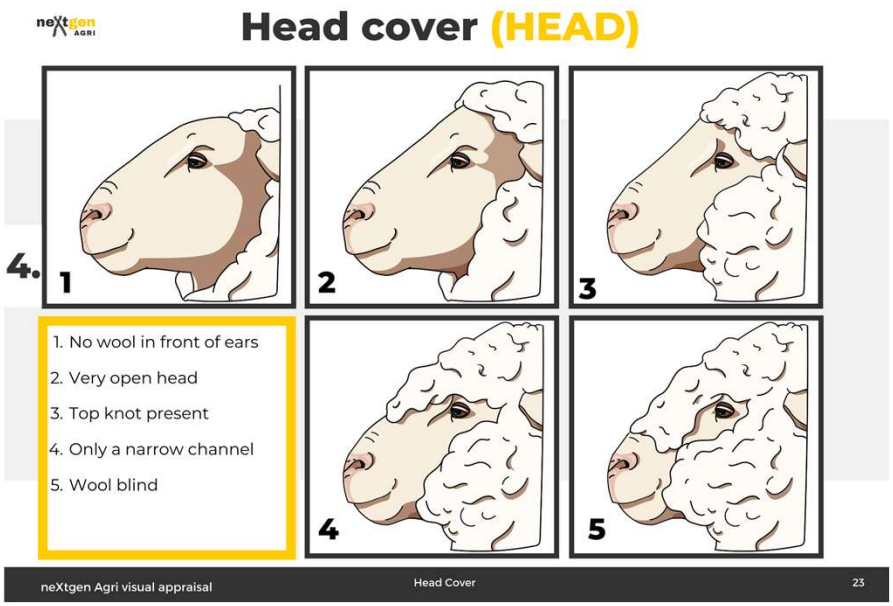
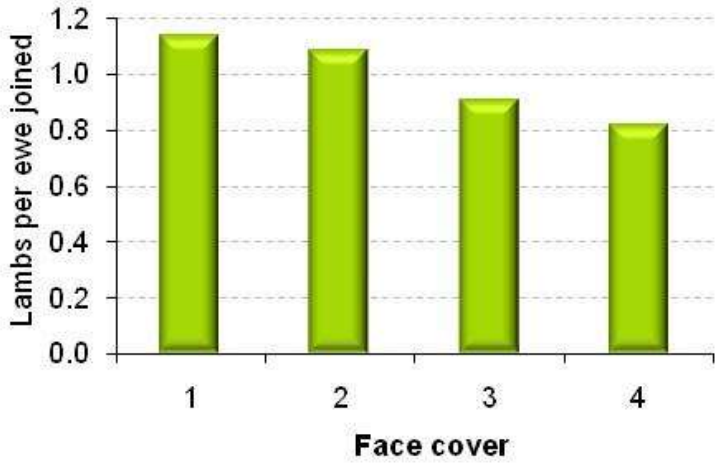


Fat sires breed fit lambs

- At the same birth weight lambs from high fat sires survive better

- Twin born lambs
- Thompson et al. 2012





- **NLW: – 0.48**
- **Conception: – 0.09**
- **Litter size: -0.52**
- **Ewe rearing ability: 0.04**

(Brown et al. 2017)

Wrinkle and lambs

The association between neck wrinkle and fertility in Merino ewes in south-western Australia

HE Fels

Australian Journal of Experimental Agriculture and Animal Husbandry 4(13) 121 - 123
Published: 1964

Abstract

A flock of 920 Merino ewes was divided into three classes on neck wrinkle, and these were subdivided into two face-cover classes. The wrinkly classes were typical of Merino ewes in the Great Southern region of West Australia, and the remainder were plainer. The ewes were mated together and grazed together until late pregnancy. They were classified into neck-wrinkle and face-cover classes eleven days before lambing, and grazed separately during lambing. The ratio of lambs born: ewes mated was 69 per cent in the wrinkly groups (453 ewes), 89 per cent in the intermediate groups (396 ewes), and 84.5 per cent in the plain groups (71 ewes). The variation due to wrinkle was highly significant.

https://doi.org/10.1071/EA9640121

- **NLW: -0.43**
- **Conception: -0.31**
- **Litter size: -0.22**
- **Ewe rearing ability: -0.10**

(Brown et al. 2017)

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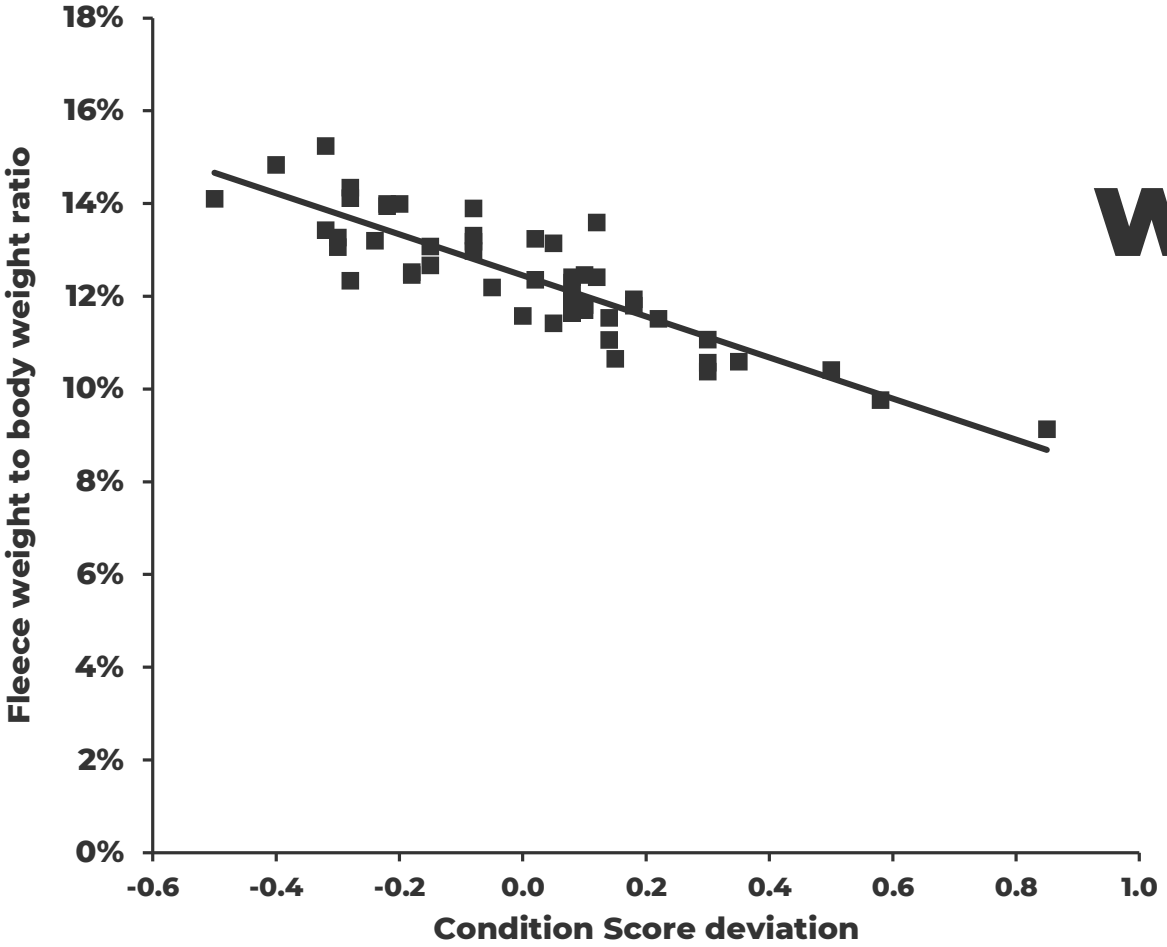

Wool is not free.

Data from Peter Westblade Memorial wether trial, Craig Wilson and Associates.

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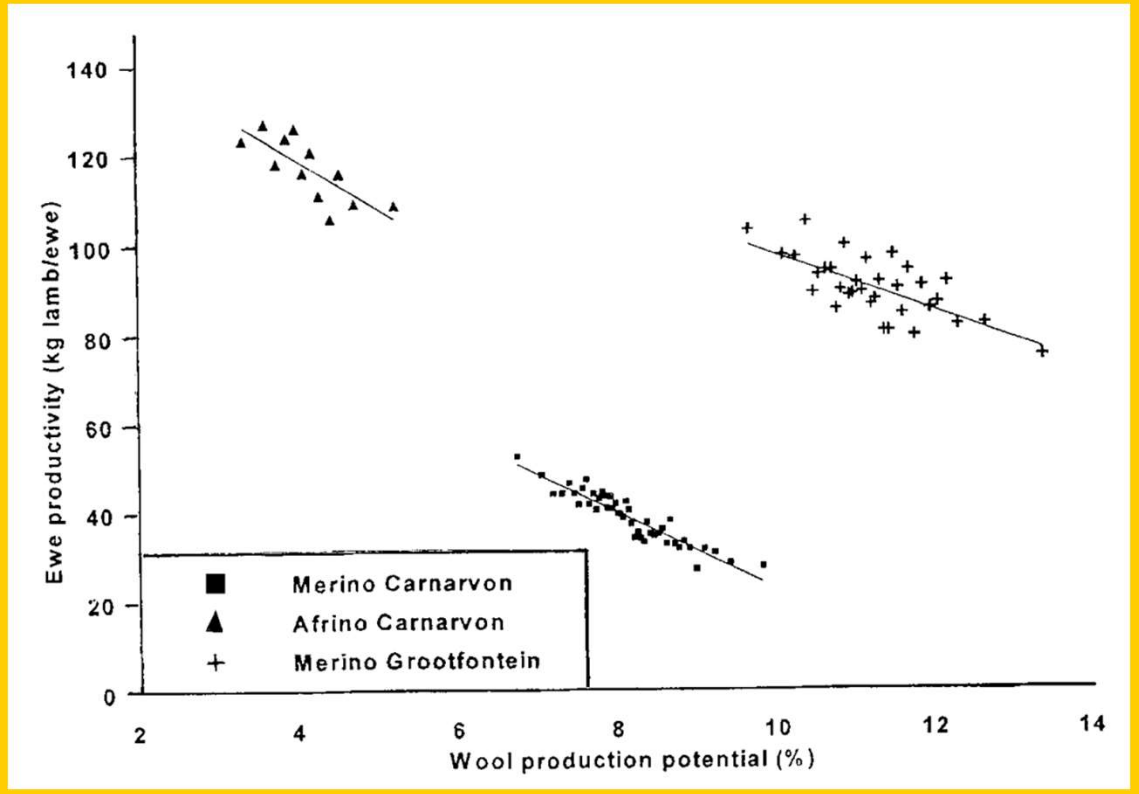


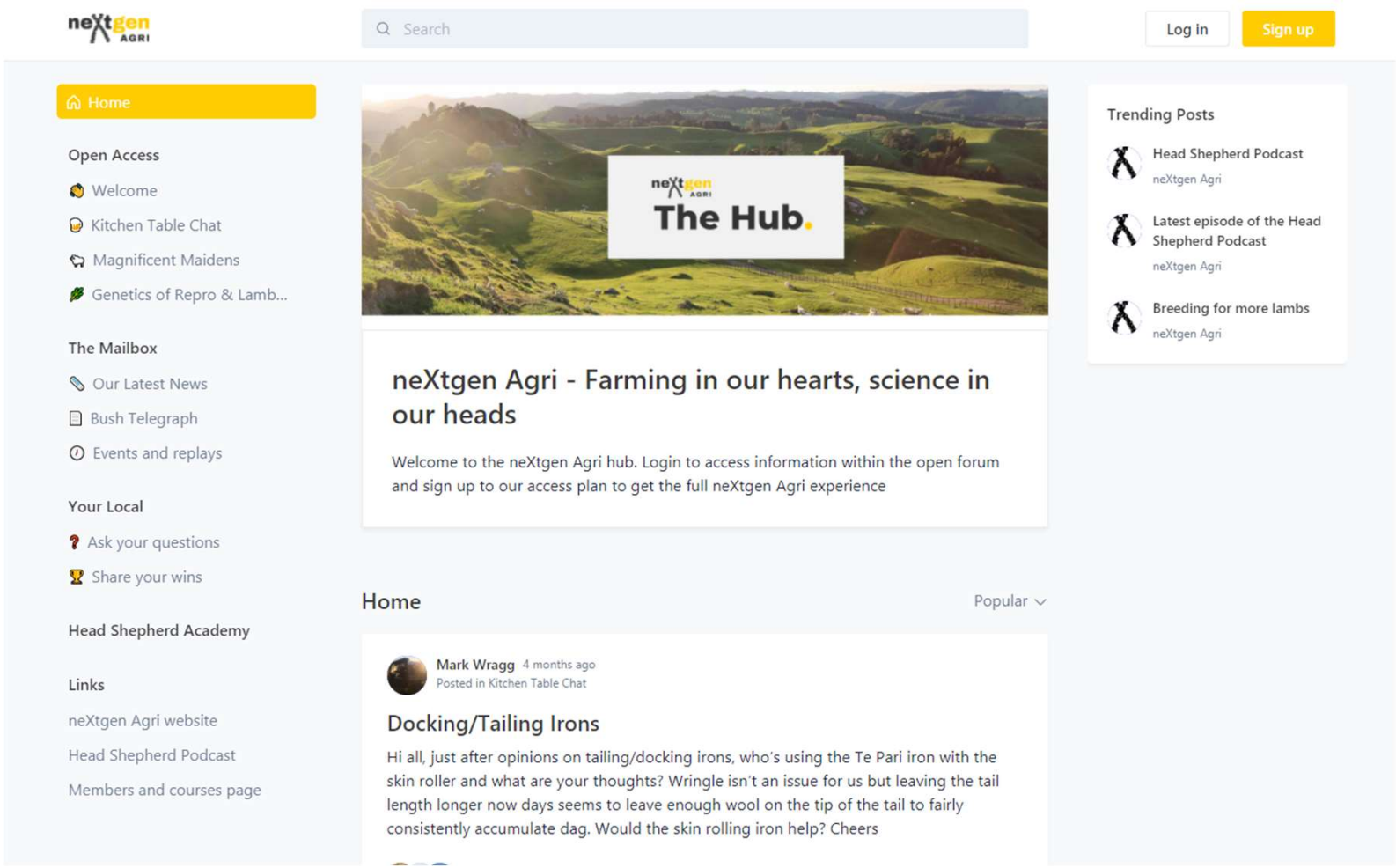
Herselman *et al*. 1998

Wool productivity

- Kg of wool per kg of body weight is problematic
- It is antagonistic with lamb production

Fleece weight and Condition score

-0.20 genetic correlation between fleece weight and condition score at various repro stages



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Questions

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Breeding for more lambs.

Session 3.

Questions

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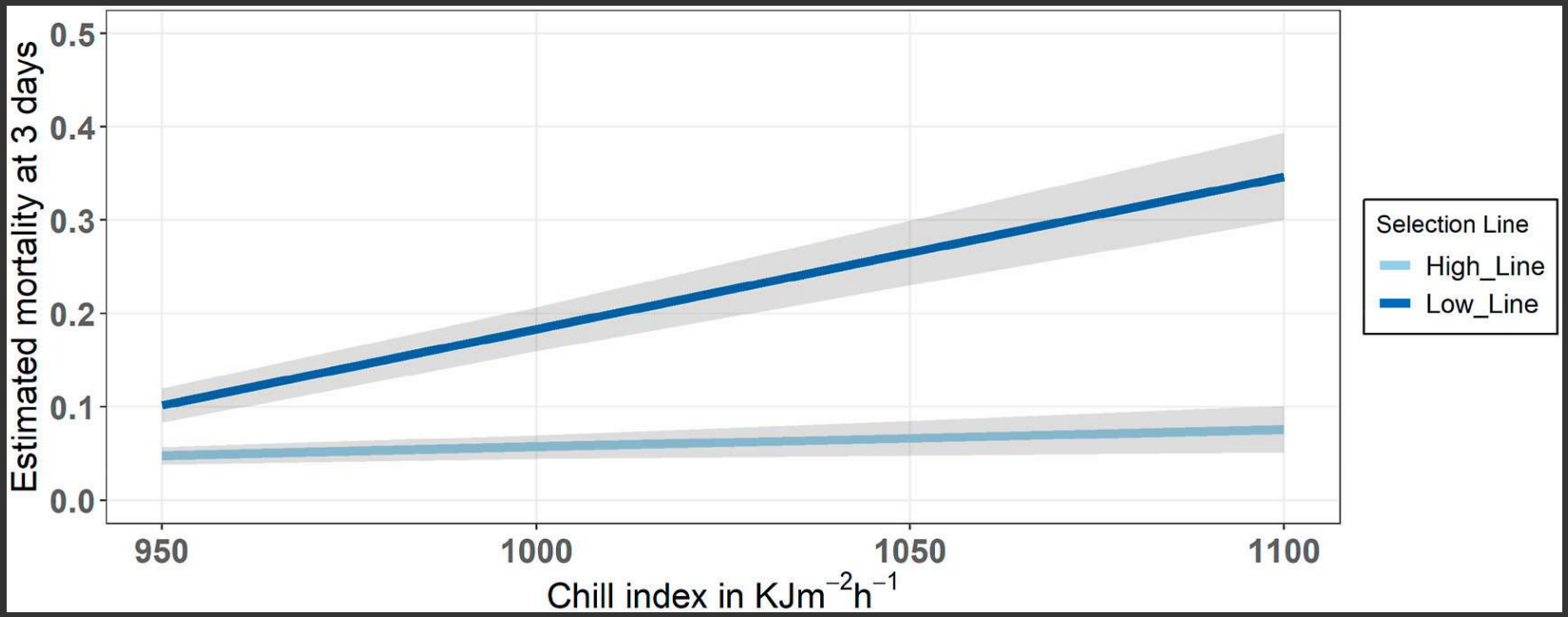
Lessons from Elsenburg



Nel *et al.* 2021

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Lessons from Elsenburg

Table 1 Least squares means (± s.e.) for dag score on two occasions, breech fold score, and crutching time in relation to selection line and gender

Effect	Number of observations	Dag score		Breech wrinkle score	Crutching time (s)
		Autumn	Spring		
Selection line:		**	**	**	**
H line	131	1.47 ± 0.06	1.81 ± 0.09	2.25 ± 0.07	31.7 ± 1.2
L line	18	2.25 ± 0.17	2.99 ± 0.24	3.20 ± 0.20	44.4 ± 3.4

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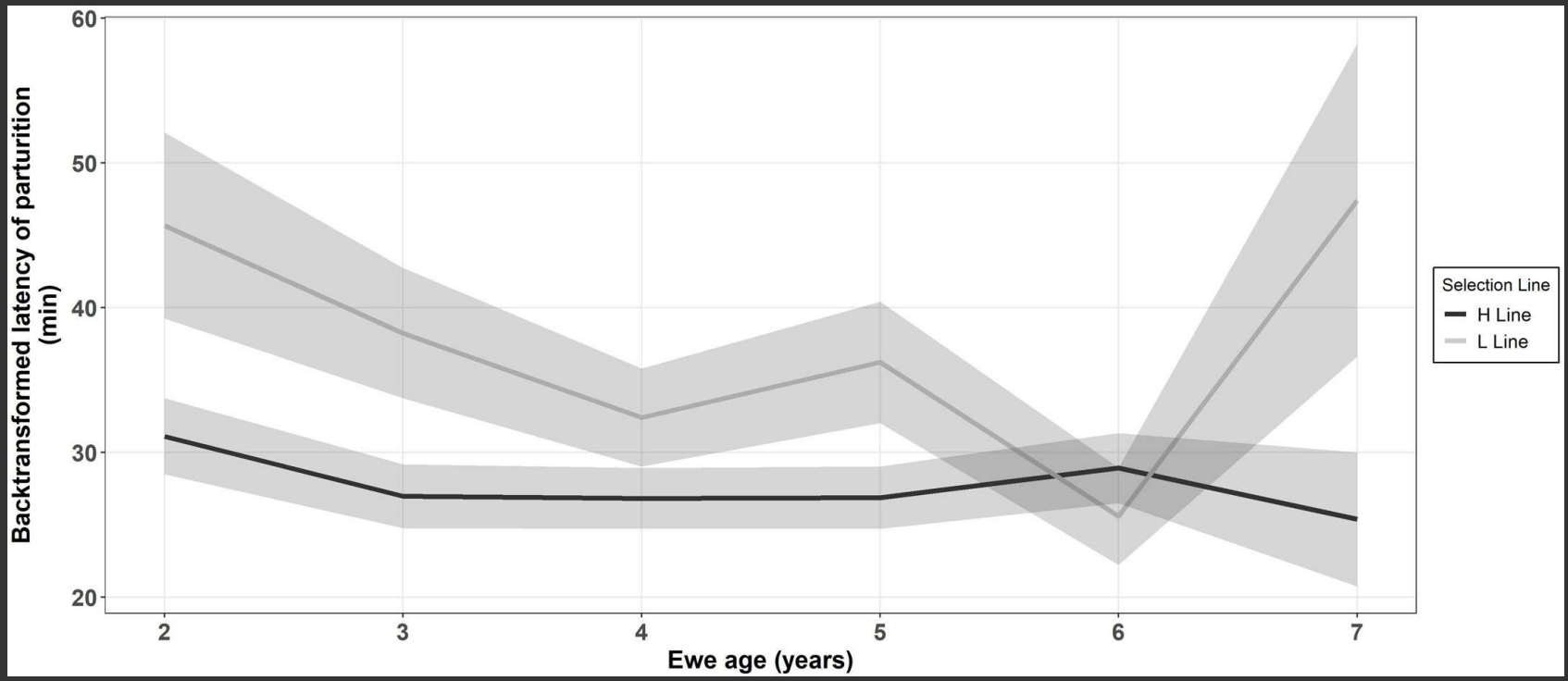
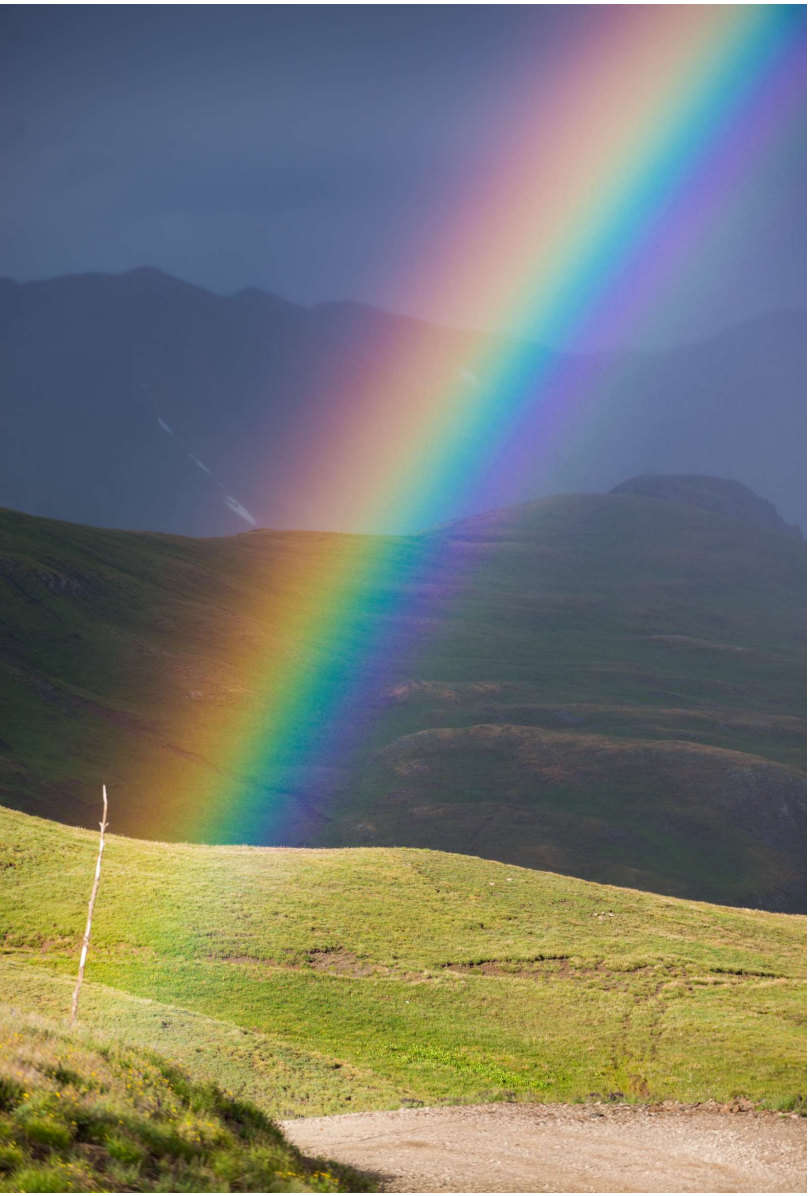
Lessons from Elsenburg

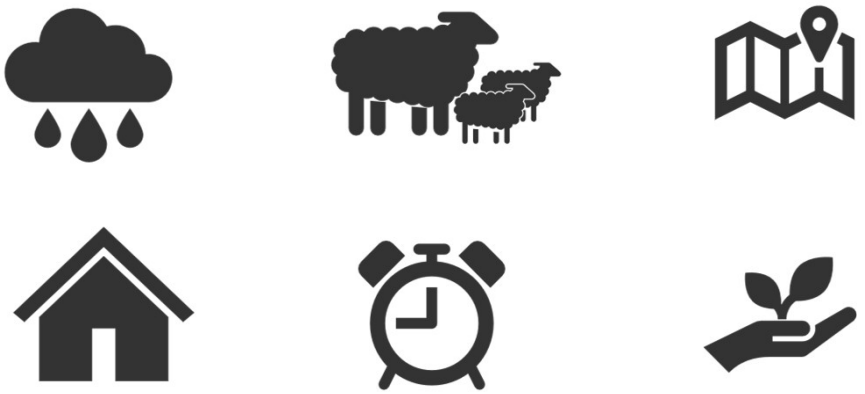


Replacement ewes.

Keeping the right ones in the flock



Most of what we see is not due to genes.



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Maiden scanning Bog Roy

	Fleece weight	Micron	Scanning
Black Tag	2.5	16.5	117%
General	2.4	16.5	135%
Royal	2.4	16.4	154%

Royals – Ideal type, good carcass & wool

Plain – OK carcass, wool tending dry

Heavy – Lesser carcass, wrinkly

Lambs per ewe to the ram

	Royal	Plain	Heavy
2 tooth	118%	112%	112%
4 tooth	160%	135%	126%

Weight of ewes at tupping (kg)

	Royal	Plain	Heavy
2 tooth	46.4	45.8	45.5
4 tooth	48.4	48.9	47.8

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	Weight at scanning			
	Dry	Single	Twin	Average
Born single	49.1	51.3	54.9	51.8
Born twin	49.9	51.2	54.5	52.0

	Scanning result			
	Dry	Single	Twin	Average
Born single	6%	77%	17%	111%
Born twin	5%	70%	25%	120%


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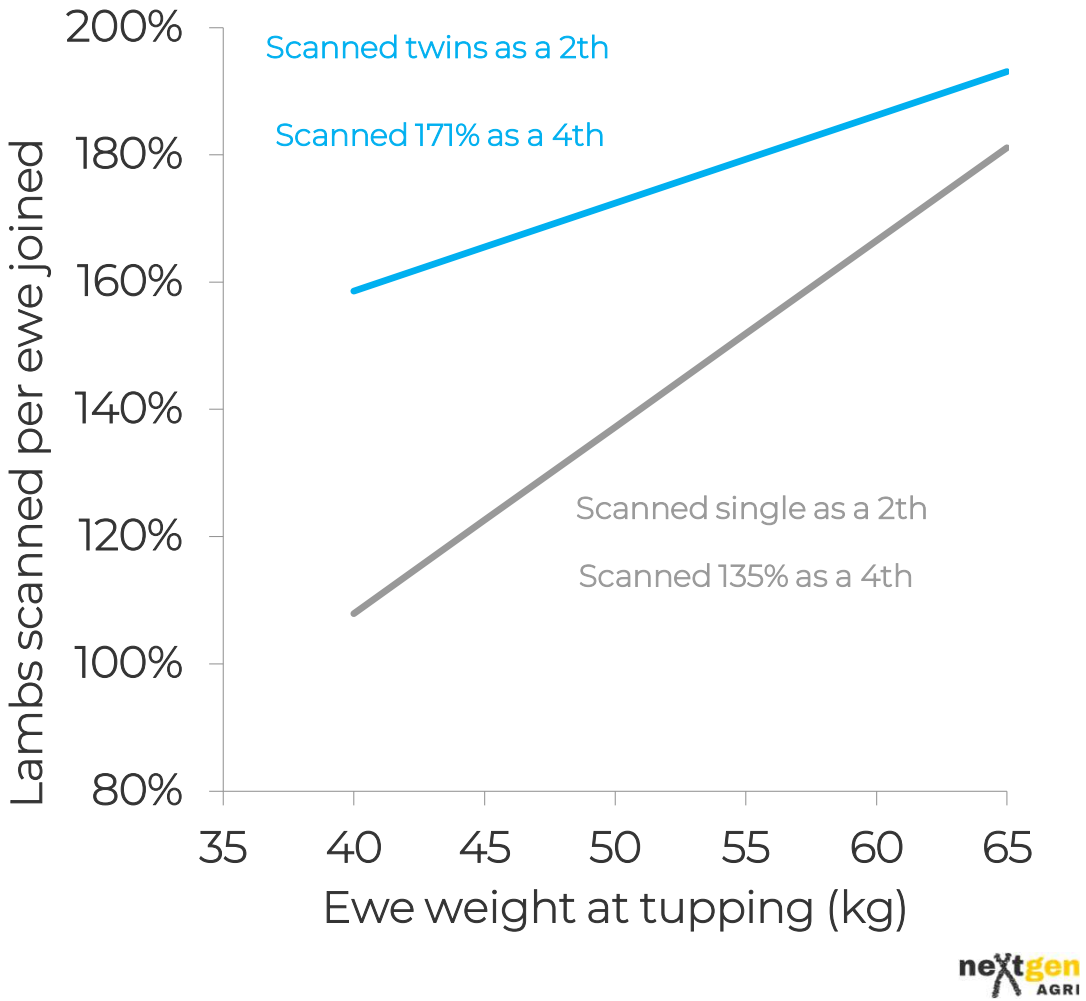
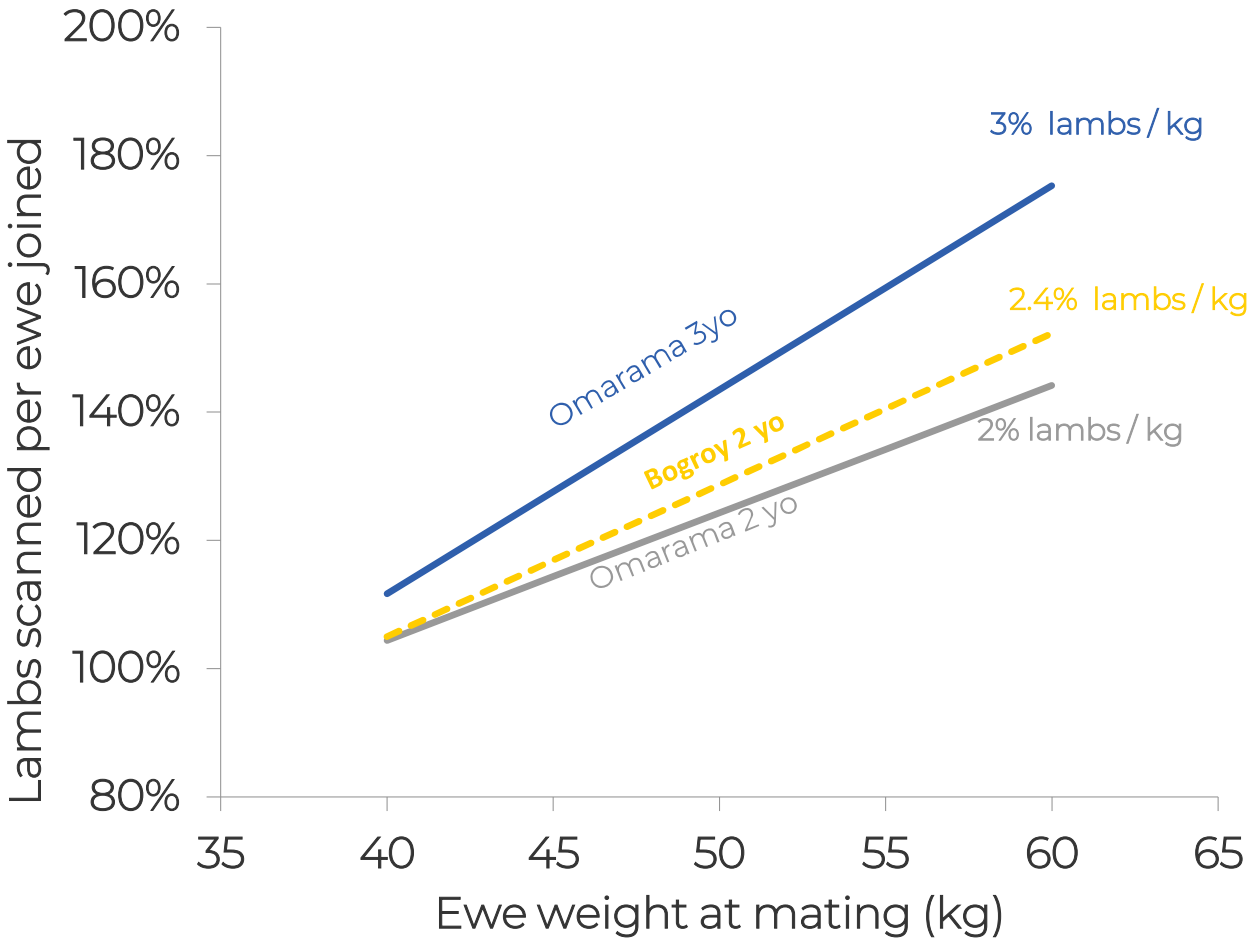

200%
180%
160%
140%
120%
100%
80%
Lambs scanned per ewe joined
Scanned twins as a 2th
Scanned 171% as a 4th
Scanned single as a 2th
Scanned 135% as a 4th
35
40
45
50
55
60
65
Ewe weight at tupping (kg)


200%
180%
160%
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100%
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Lambs scanned per ewe joined
35
40
45
50
55
60
65
Ewe weight at mating (kg)
3% lambs / kg
2.4% lambs / kg
2% lambs / kg
Omarama 3yo
Bogroy 2 yo
Omarama 2 yo

86 4yo ewes that have twinned at every opportunity
- Averaging 58.7kg

309 4yo ewes that have had a single at every opportunity
- Averaging 52.6kg

	Effect of being born a twin	What it means, twins are/have:
Weaning Weight	-2.04	2 kg lighter
Hogget Weight	-0.71	0.7kg lighter
Fibre Diameter	0.08	0.08 micron stronger
Fleece Weight	-0.14	140 g less wool
Staple Length	-3.60	3.6mm shorter
Staple Strength	0.53	0.5 higher N/ktex
Lustre	-0.09	Lower lustre
Crimp Frequency	-0.08	Lower crimp frequency
Crimp Definition	-0.10	Lower crimp definition
Nourishment	-0.12	Drier wool
Density	-0.07	Lower density
Staple fineness	0.23	Blockier staples
Staple Definition	-1.51	Less defined staples
Lambs Weaned	0.05	More lambs

The impacts of being born a twin.

- Twin born lambs are less appealing in the classing race
- A disproportionate number of twins get culled
- Even worse for twins from 2 tooth ewes

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Reproduction

CON – Conception
- ewes pregnant per ewe joined
- ability of ewe to get in lamb

LS – Litter size
- Lambs per litter
- Number of lambs a ewe is scanned with

ERA – ewe rearing ability
- Lambs weaned per lamb born
- Ability to rear the lambs a ewe gives birth to

NLW – number of lambs weaned
- Lambs weaned per ewe joined
- Old trait combining all of the above

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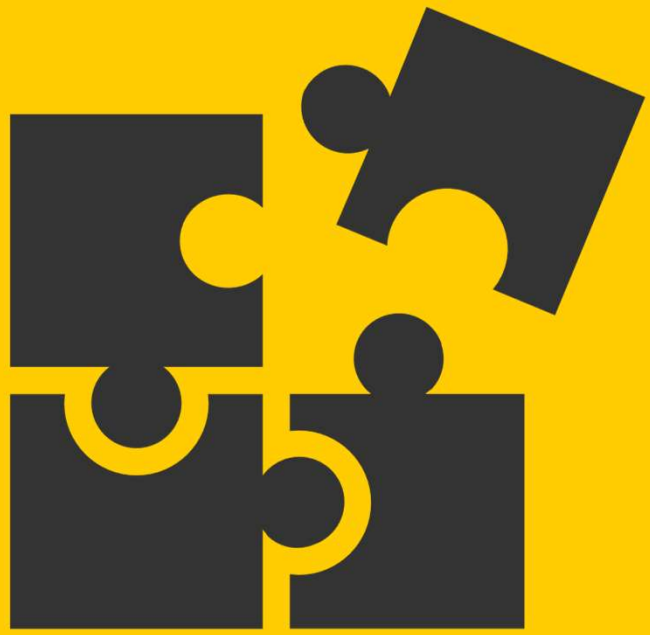
Bags of genes

If you can measure it, why would you guess?

Searching for rams.

Once you know your focus traits and your cut-offs you are ready to search for rams.

The Sheep Genetics website is the perfect place to start



Preparing for sale day.

- Do your homework
- Mark up your catalogue with the rams that suit
- Cut down the rams you need to inspect using the data

Inspecting rams on sale day.

- Structure
- Function
- Shape
- Type
- Wool (if applicable)

Replacement ewes.

Keeping the right ones in the flock

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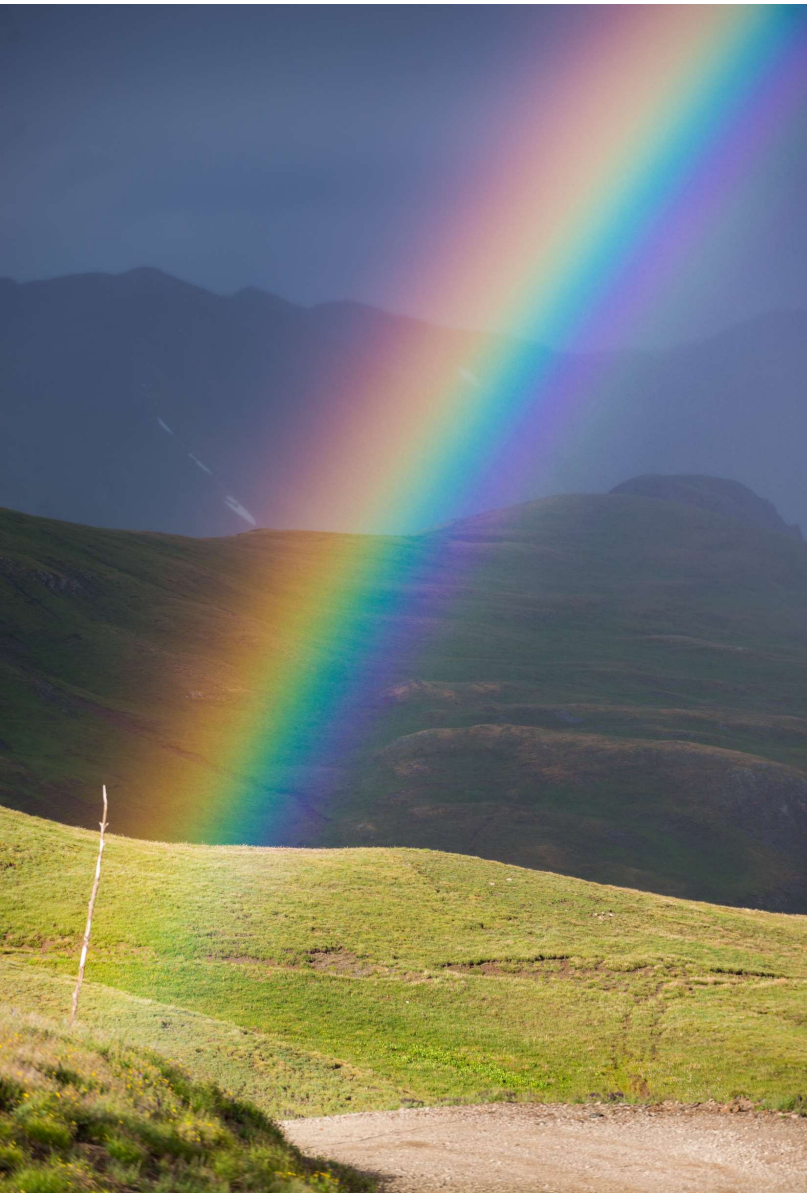
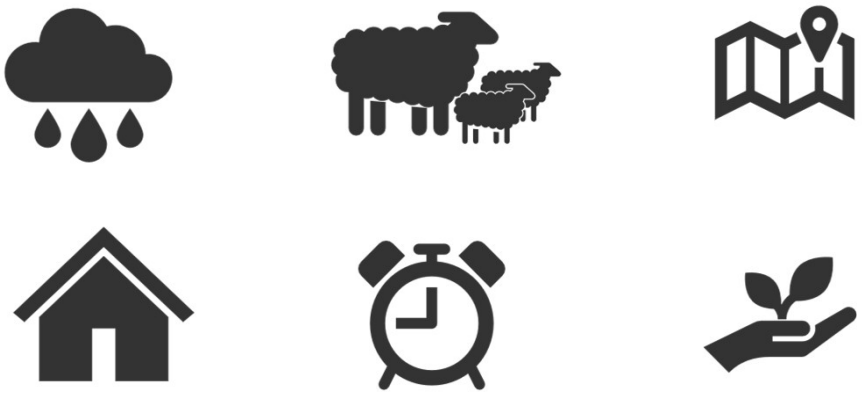


Most of what we see is not due to genes.



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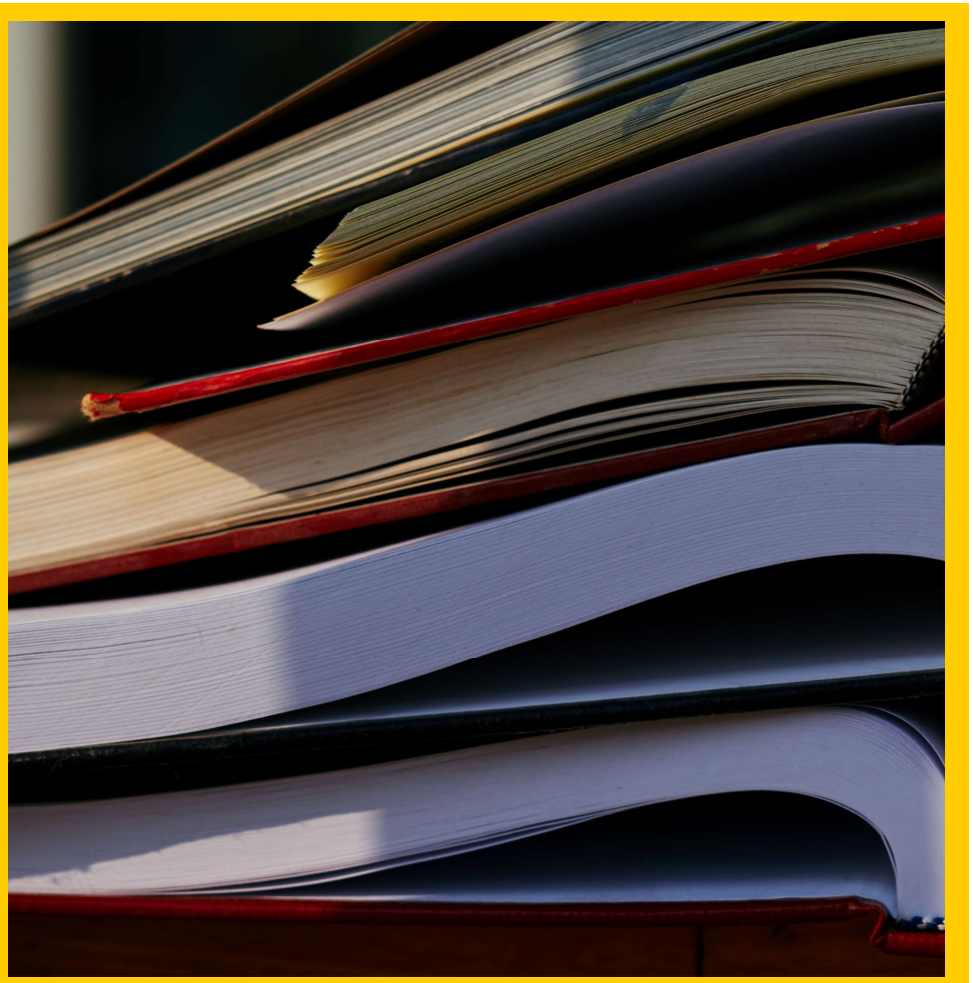
“...knowledge is power”

Thomas Jefferson



Thank you.


+64 3 550 2442


info@nextgenagri.com


www.nextgenagri.com

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