# Breeding the meat you want to eat

## *Turning data into on-farm decisions*


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# Outline

- The yield & quality balance…
- Genetic trends
- Branding based on quality
- Goat carcass & meat quality
- Time off feed impact on HSCW



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What industry are we all in?





**FOOD INDUSTRY**

## Common Goal:

**Extract as many $$$ from consumers as possible**



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# Value of a carcase

=

**Quantity of saleable meat**

**X**

**Quality of the meat**









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# Australian beef brands

- 42 MSA beef processors
- 196 beef brands
- >20 brands have adopted exporter guidelines to communicate MSA overseas




MEAT STANDARDS AUSTRALIA GRADED

# Retail Beef Brands - coles

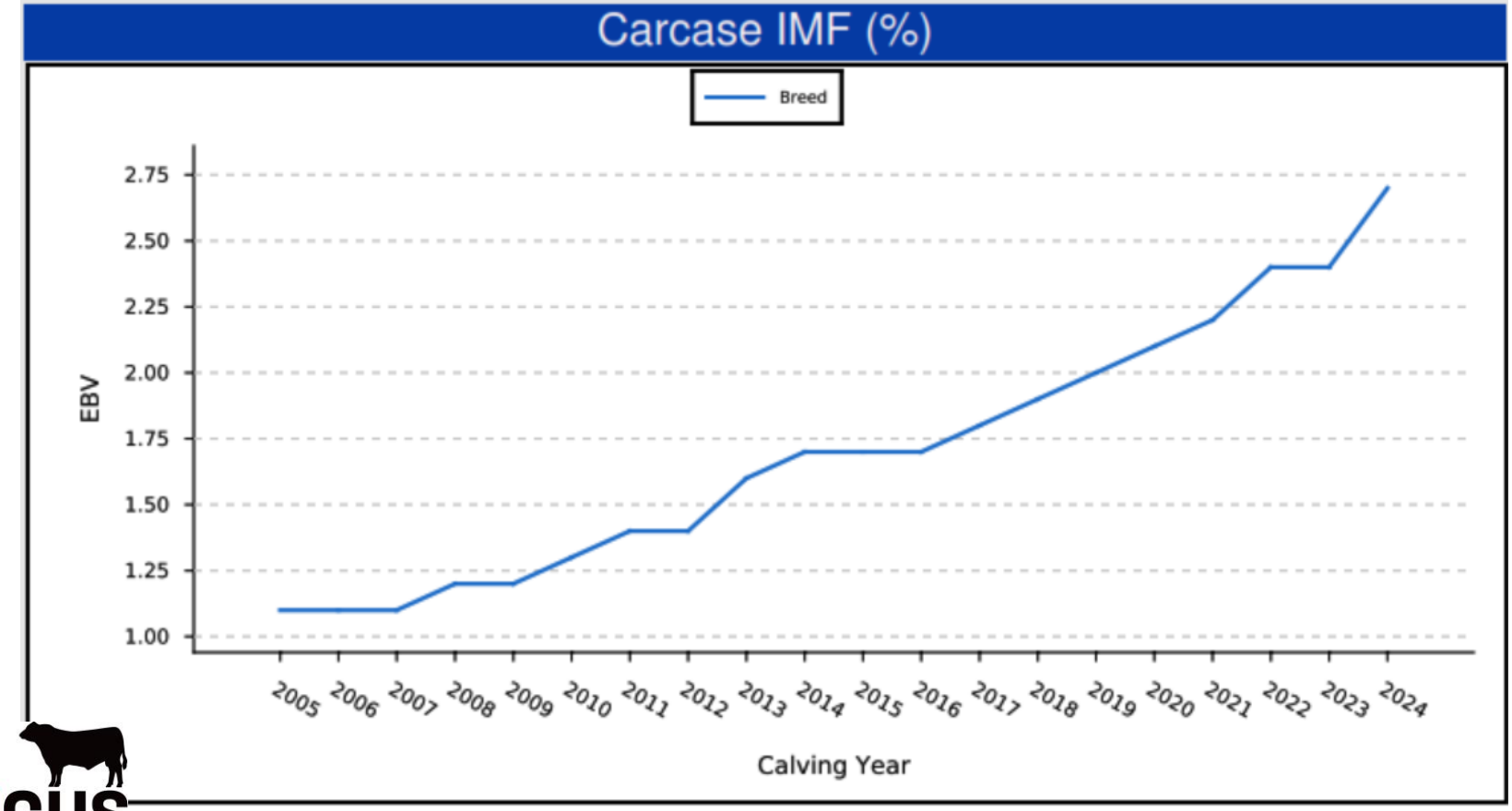



| Good | Better | Best |
|---|---|---|
| Drovers Choice | Coles Butcher | Coles Finest |
| $34.00/kg | $45.55/kg | $59.46/kg |

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# Angus IMF Genetic Trend

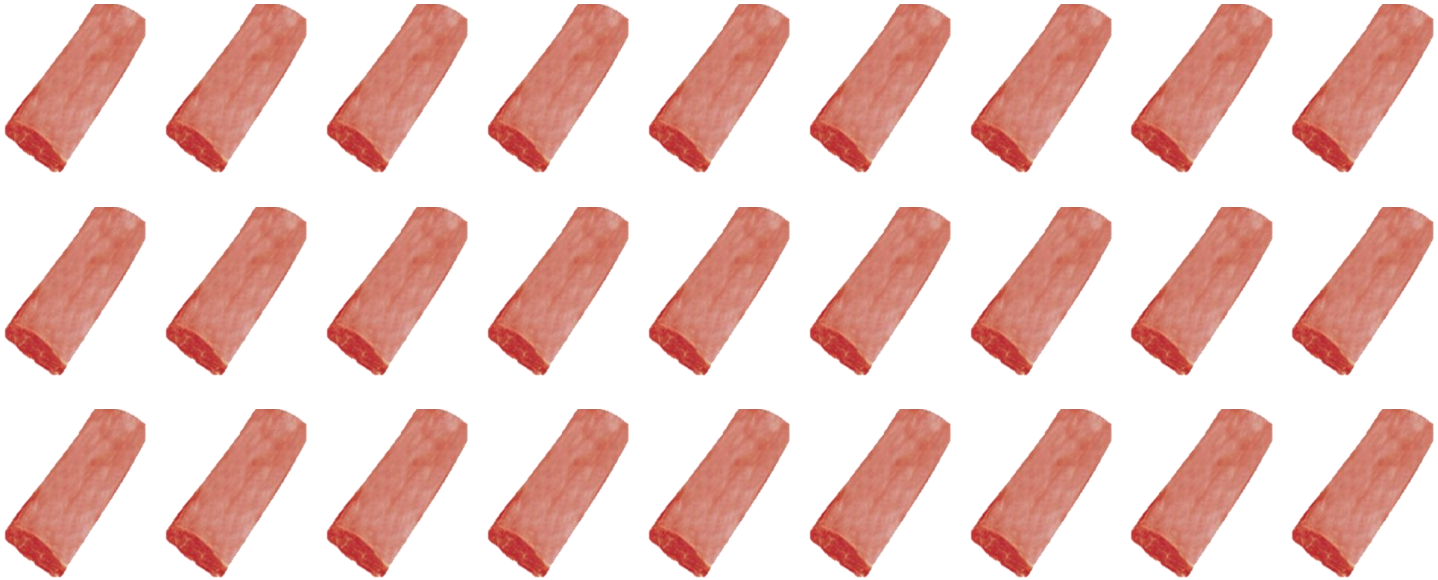



ANGUS AUSTRALIA

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# Pack all lamb together

YUMMY BRAND

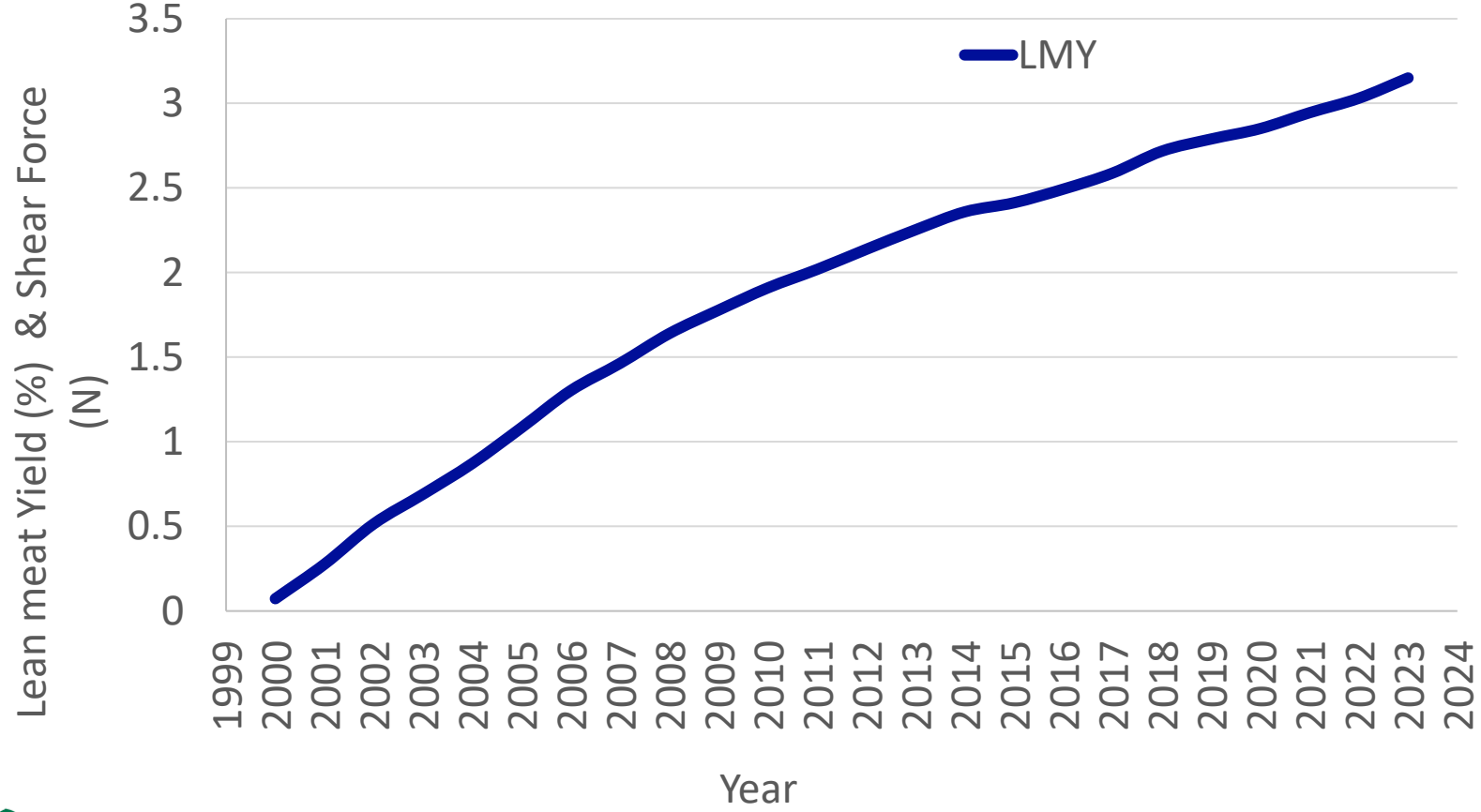


“All lamb is good”

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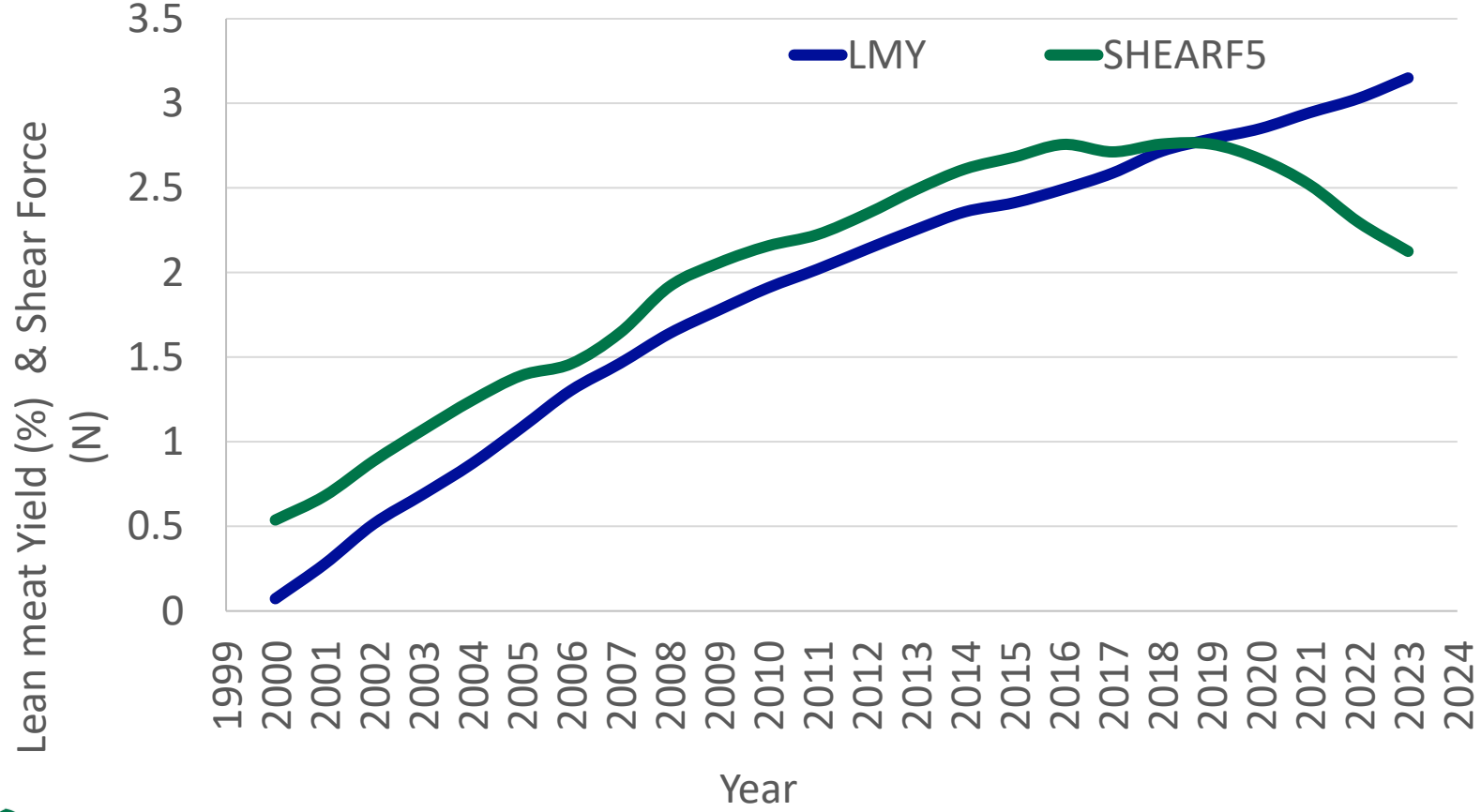
# Terminal genetic trends




sheep GENETICS

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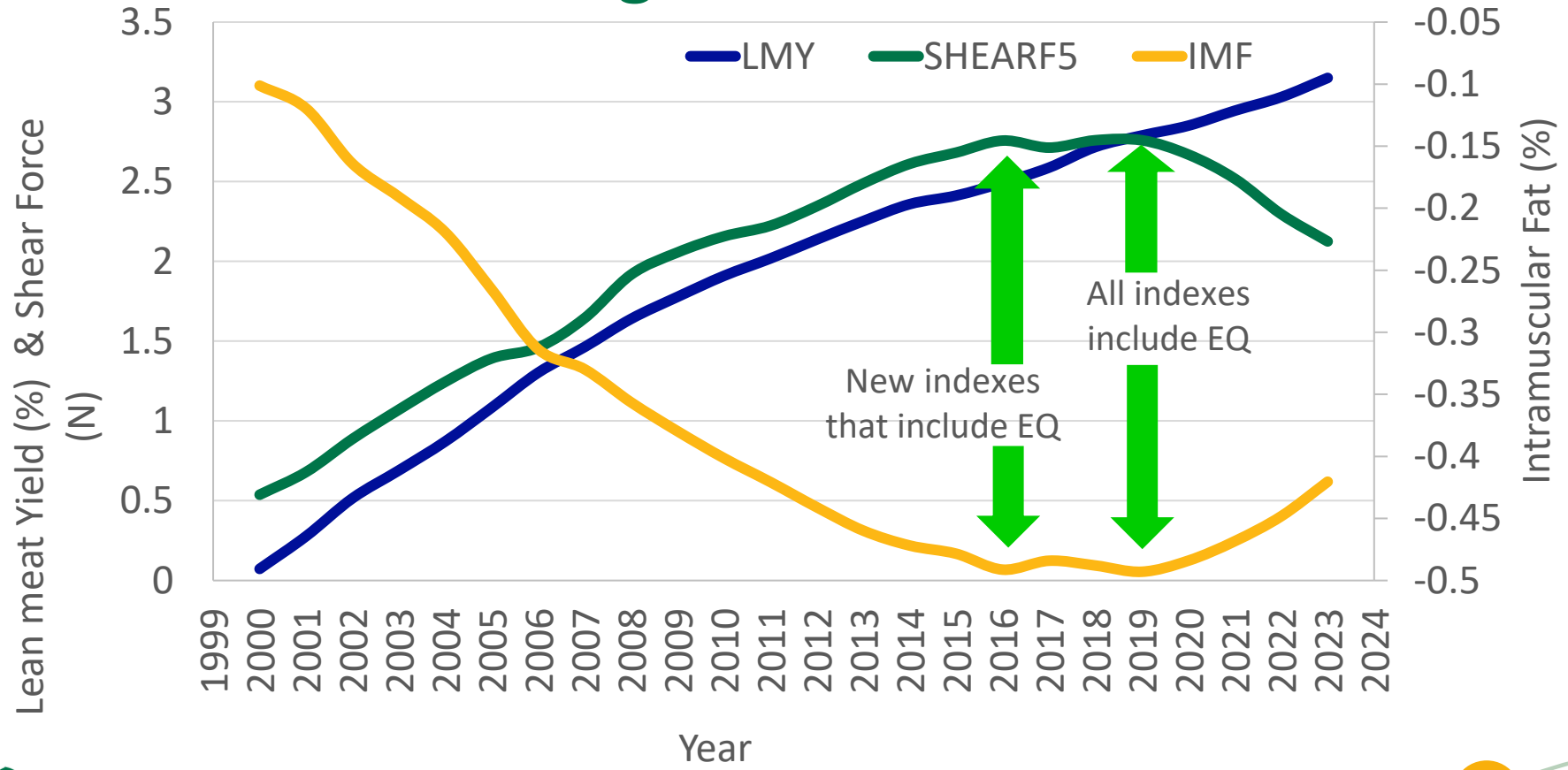
# Terminal genetic trends




sheep GENETICS

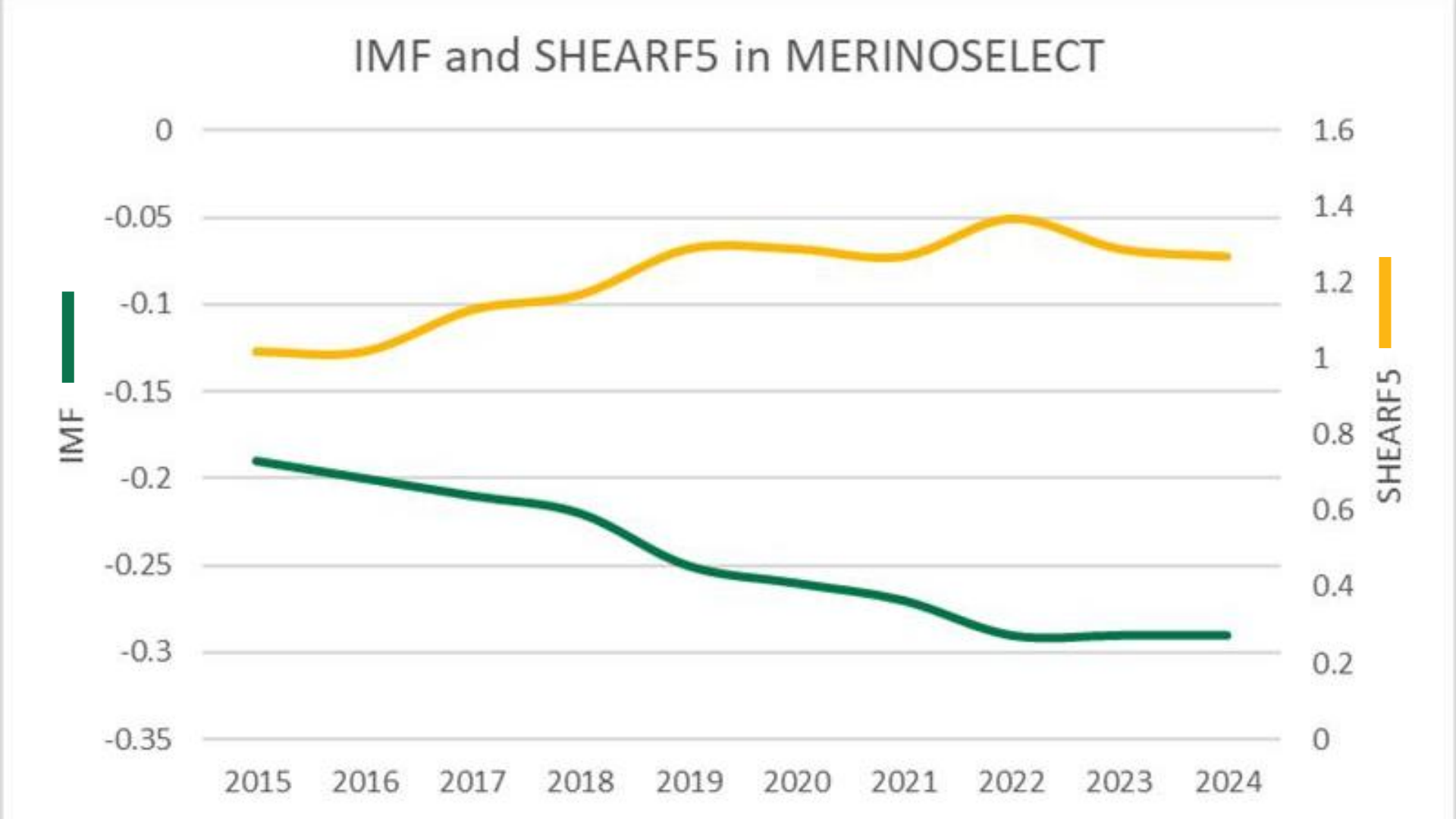
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# Terminal genetic trends

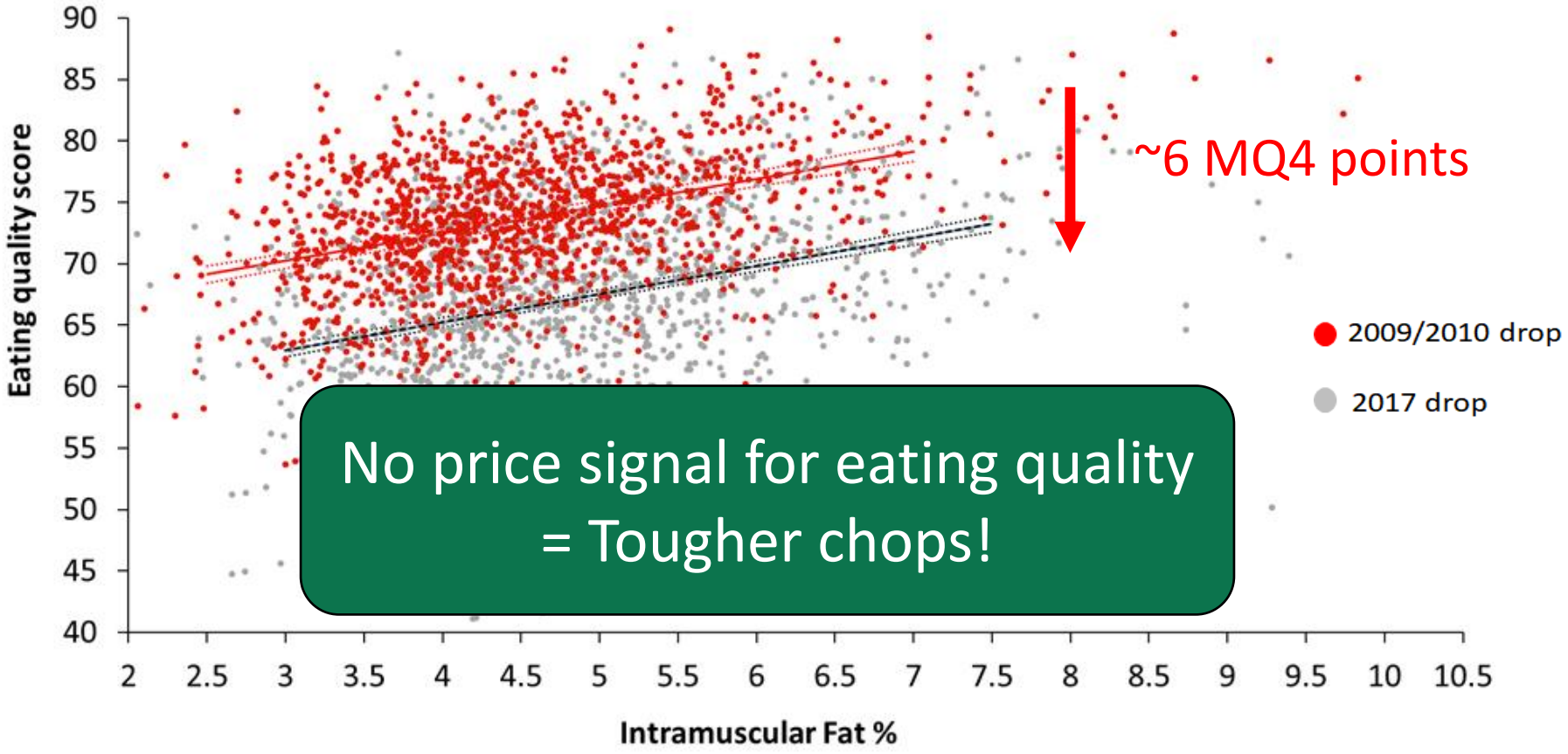



sheep GENETICS

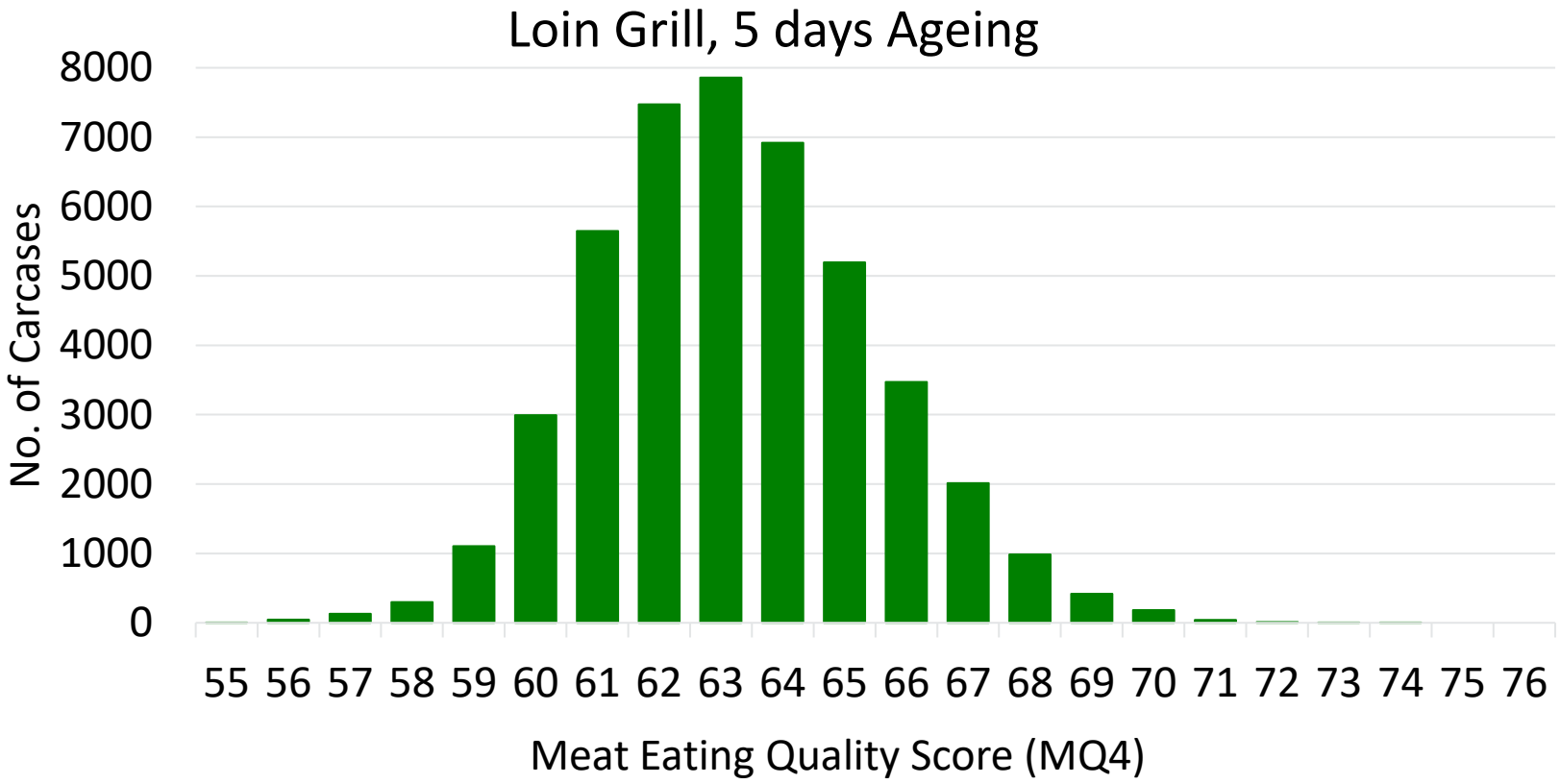
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IMF and SHEARF5 in MERINOSELECT
IMF
SHEARF5
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024

# Price signals influence eating quality

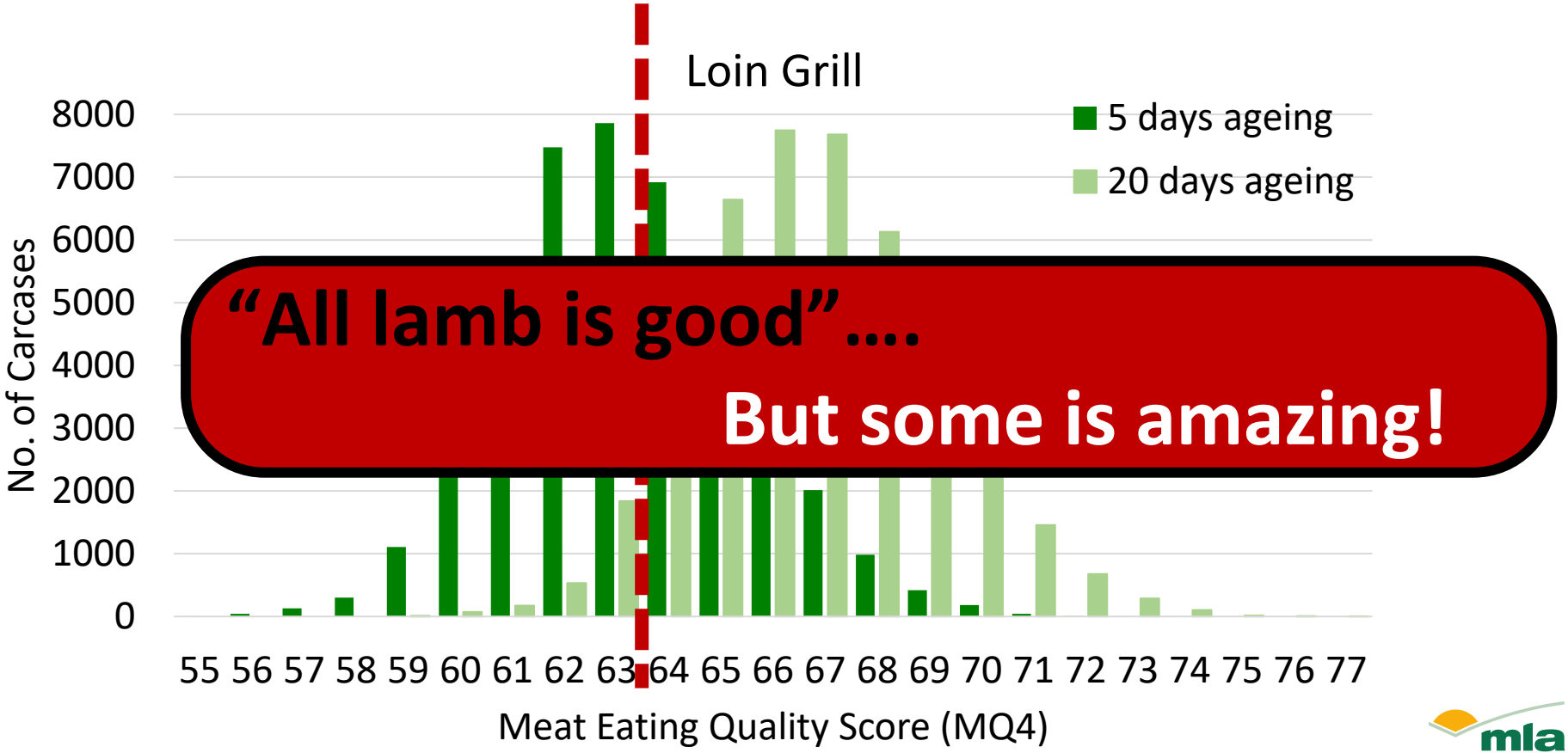


# Eating Quality variation




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# Improvement with ageing




**"All lamb is good"....**

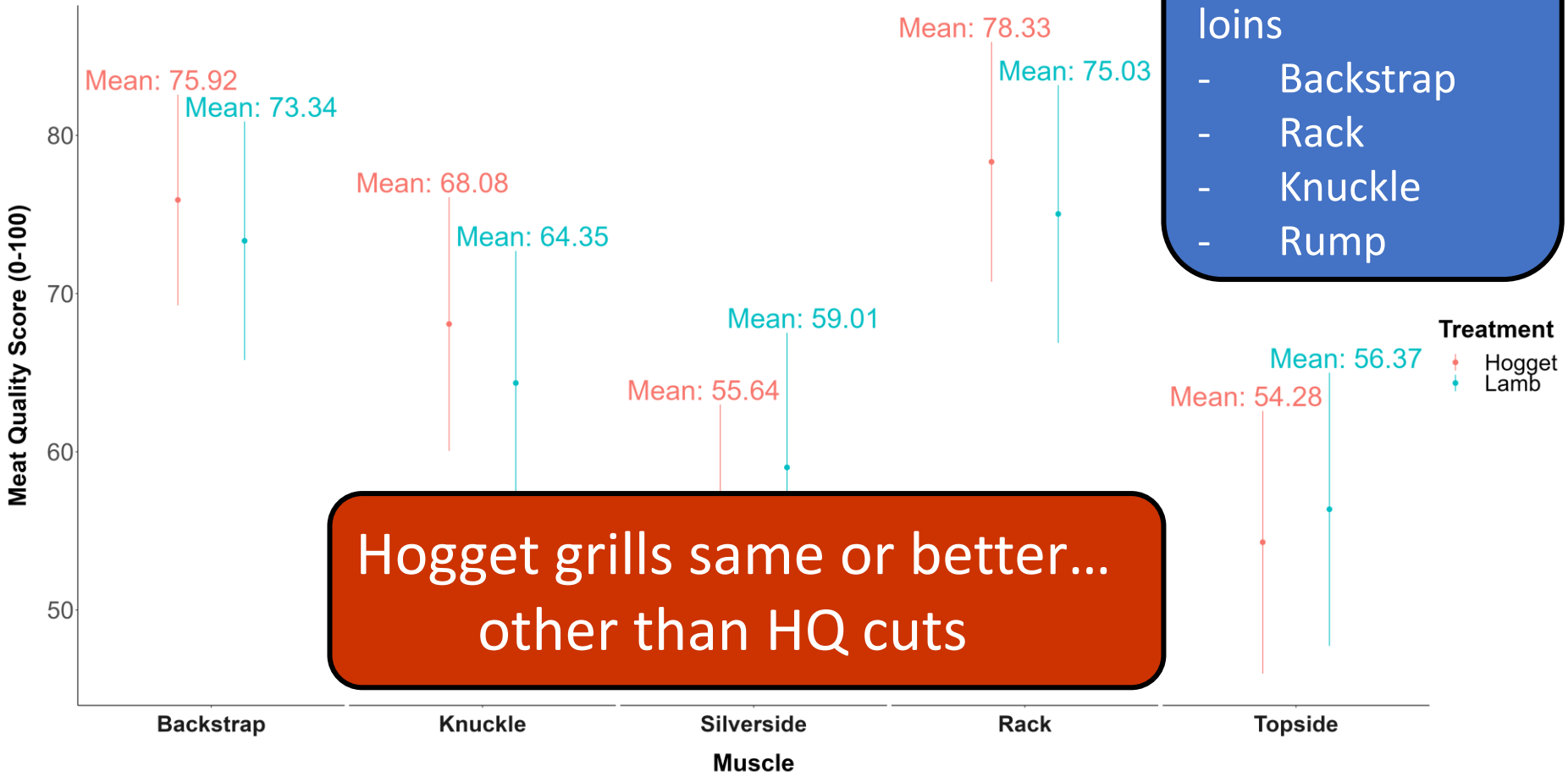
**But some is amazing!**

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# Reducing lamb eating quality variation



# Lamb & Hogget - Grills – 7 day aged

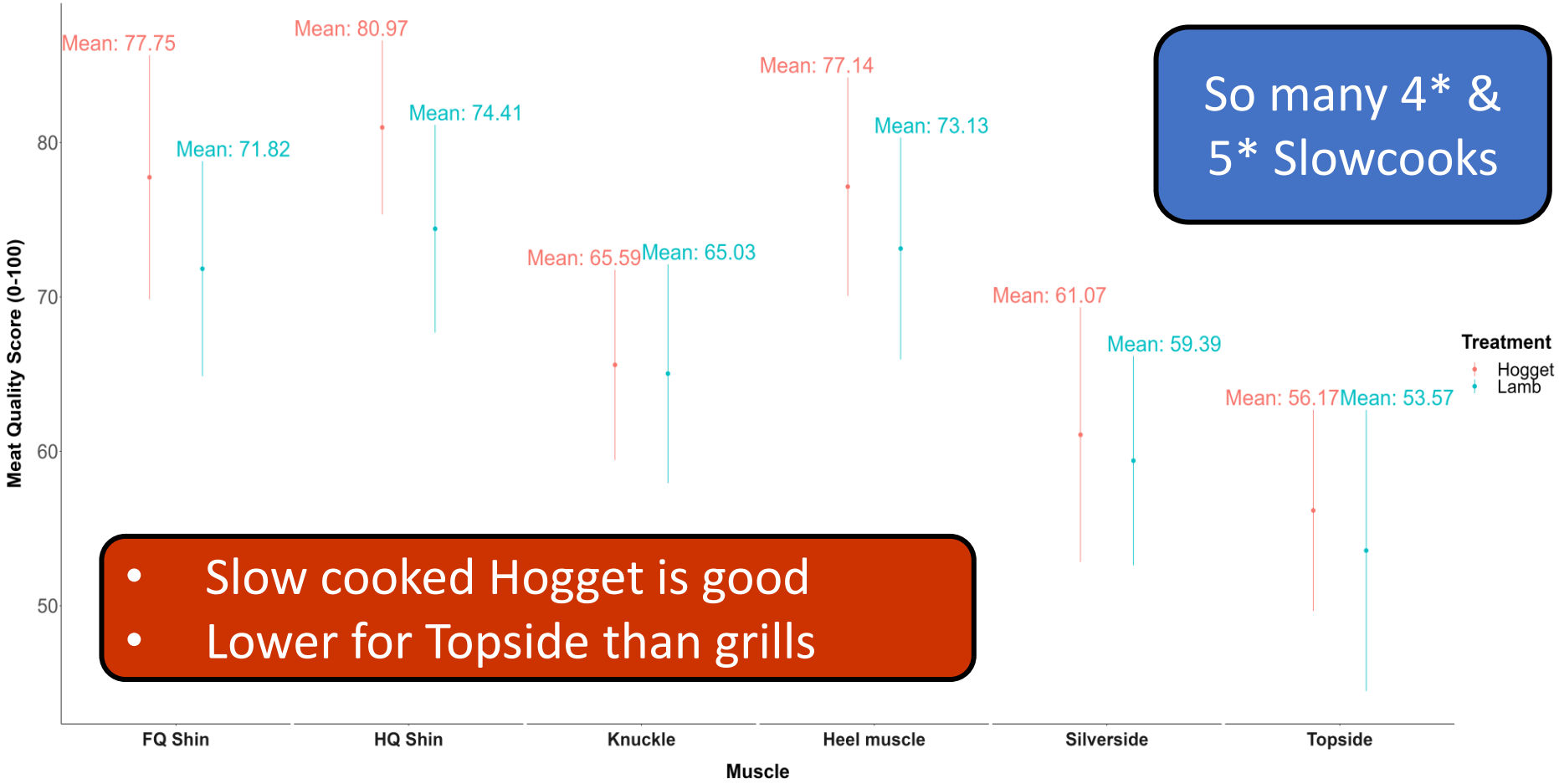



Grilled lamb has 4 loins

- Backstrap
- Rack
- Knuckle
- Rump

Hogget grills same or better… other than HQ cuts

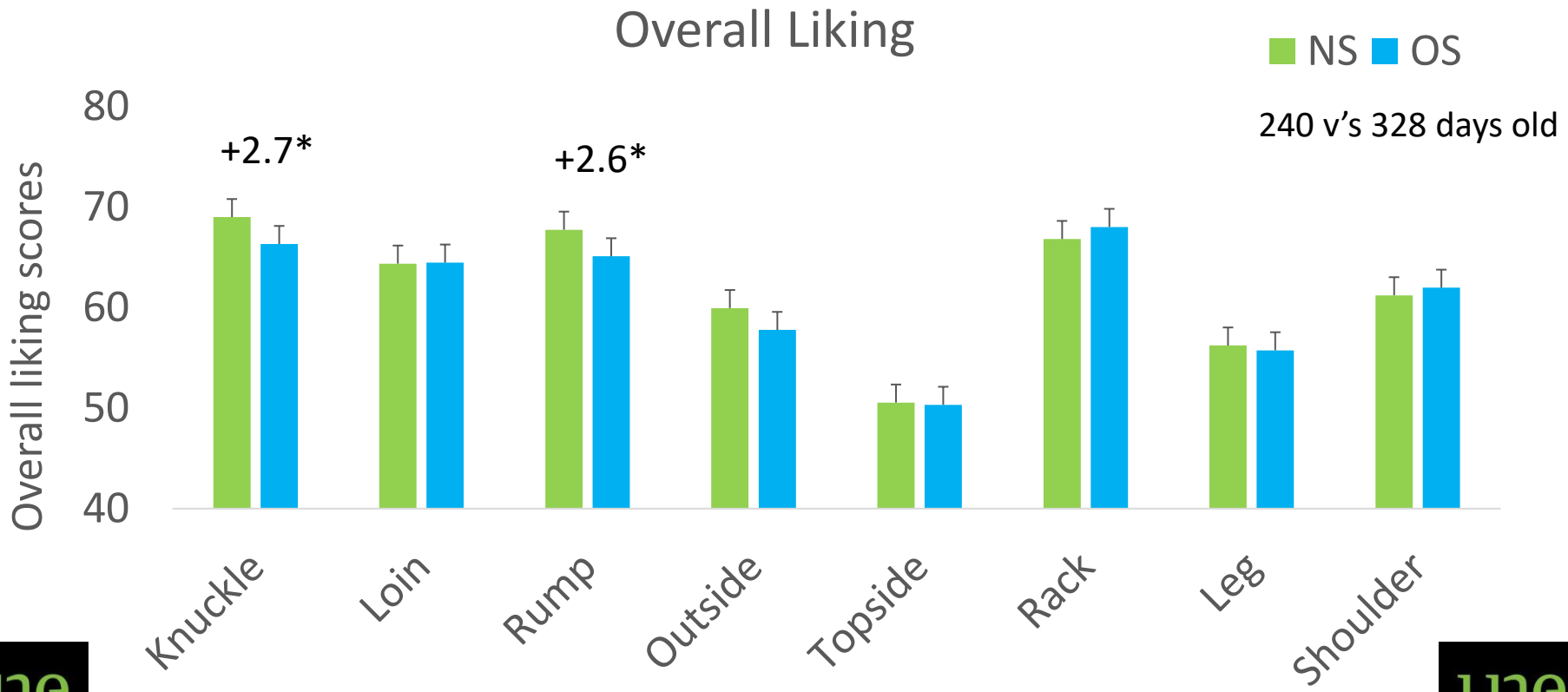
# Lamb & Hogget – Slow Cook – 7 day aged




So many 4* & 5* Slowcooks

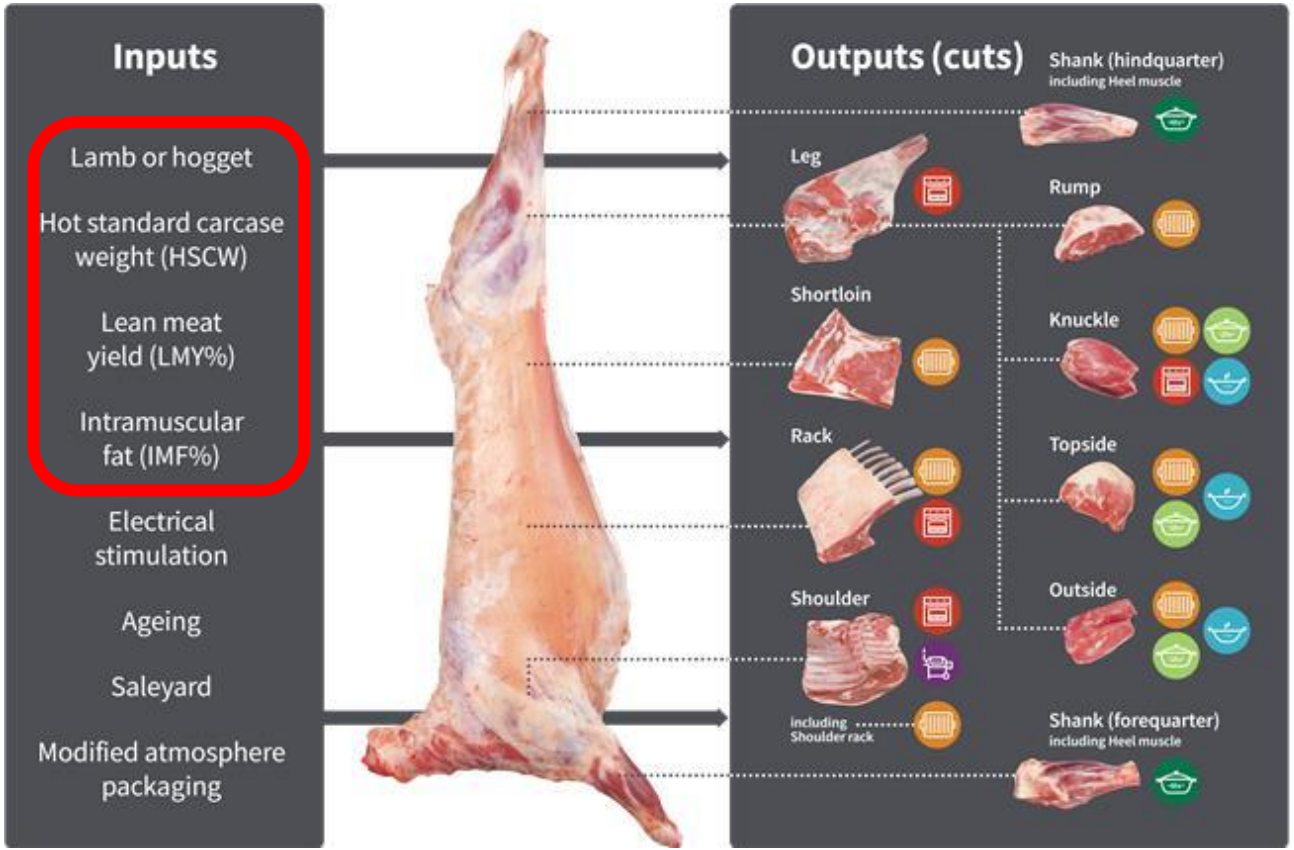
- Slow cooked Hogget is good
- Lower for Topside than grills

# New Season V's Old Season lamb




Payne *et al.* 2020 Foods

# MSA Sheepmeat Model




## Cook methods

- Grill
- Roast
- Stir fry
- Slow cook 2 hour
- Slow cook 4 hour
- Texas BBQ

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# Whats next…. Current MLA projects

- Segregation capacity – Hook tracking
- New tech to measure IMF% at chain speed accurately
- Cheaper, accurate tech to measure carcass yield
- Defining the impact of older age sheep on eating quality
- Measurement of tenderness on the carcass
  - Nuclear Magnetic Resonance
  - Dual X-ray Absorptiometry (DEXA) bone density

# Breeding Profitable Cattle & Sheep

A. Fit for ***your*** farm
B. Suitable for market









**Genetics**
**Nutrition**
**Management**

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# Fit for *YOUR* farm….

## Merinos

- Wool
- Repro
- Internal & external parasites
- Structure & type
- Growth
- Meat/Carcass

## Maternals

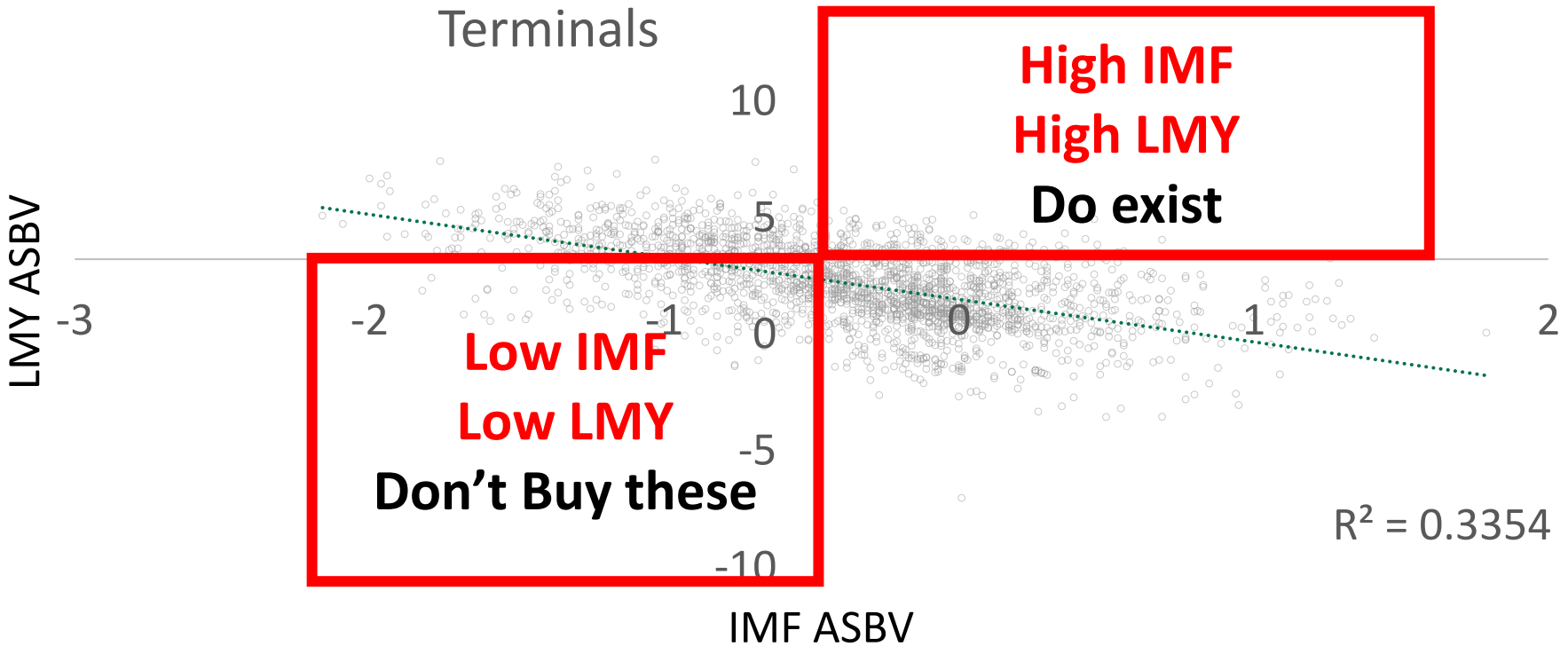
- Repro
- Internal & external parasites
- Structure & type
- Growth
- Meat/Carcass

## Terminals

- Structure & type
- Growth
- Meat/Carcass


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# LAMB Carcass Value – High LMY & IMF

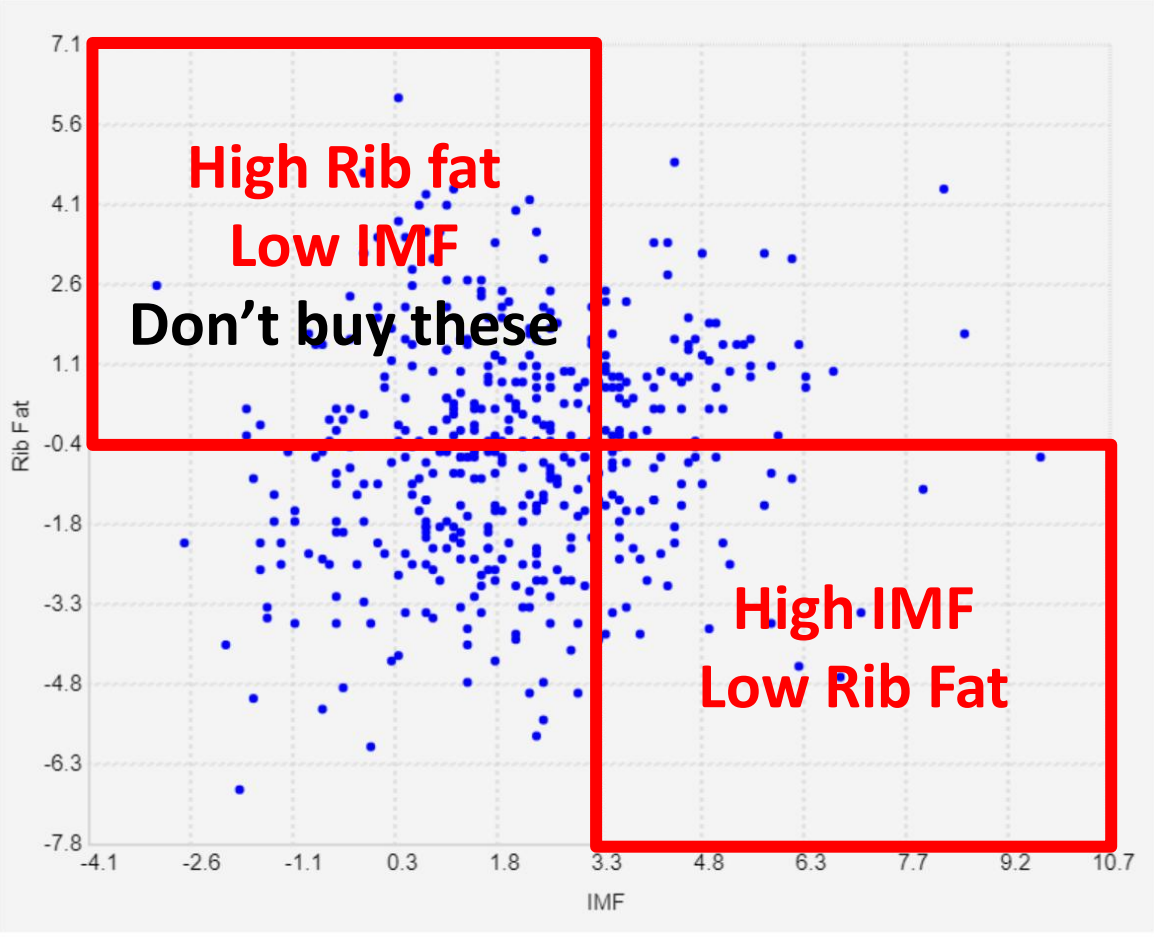



Strong Negative correlation

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# ↑ Quantity and Quality Genetically

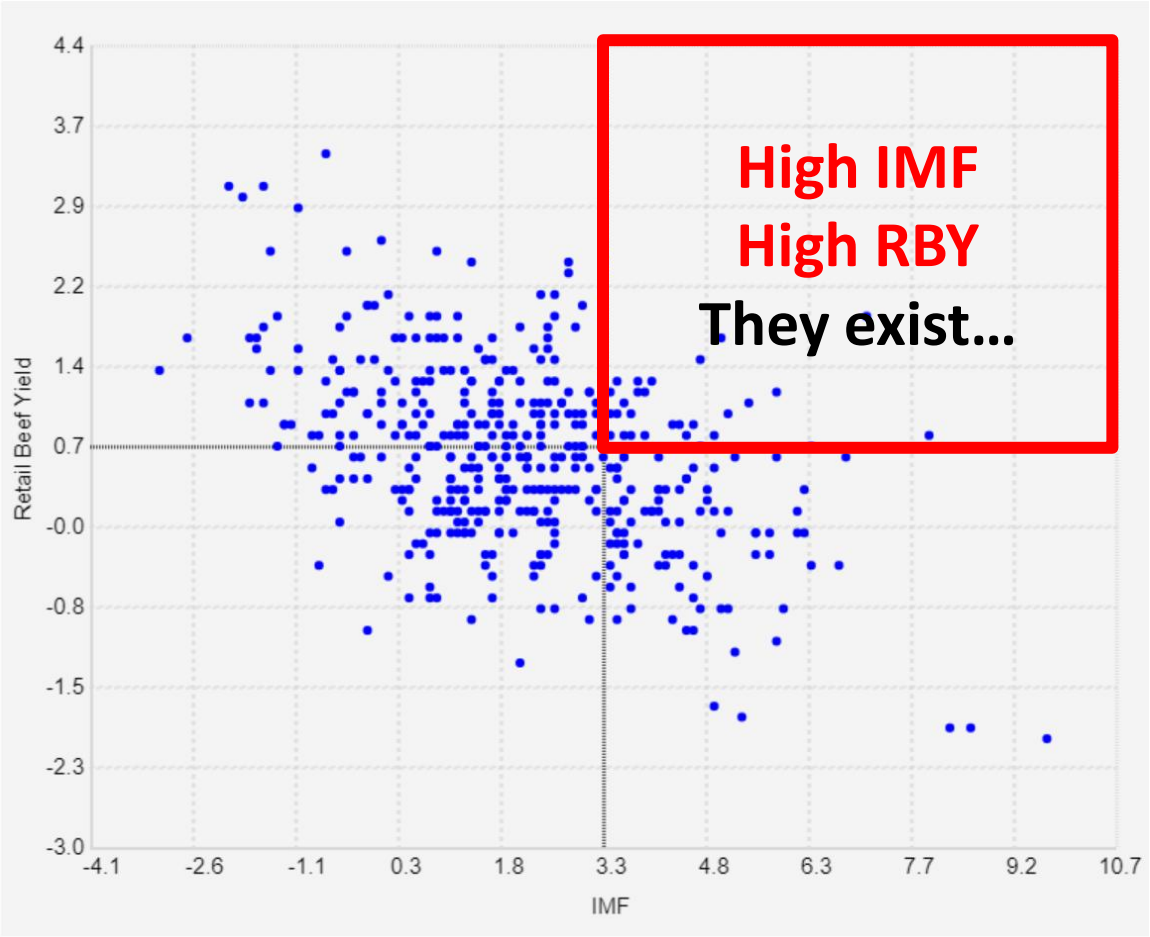



Take fat off outside of meat & put it inside

Angus Sire Benchmarking Project sires n=436

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# ↑ Quantity and Quality Genetically



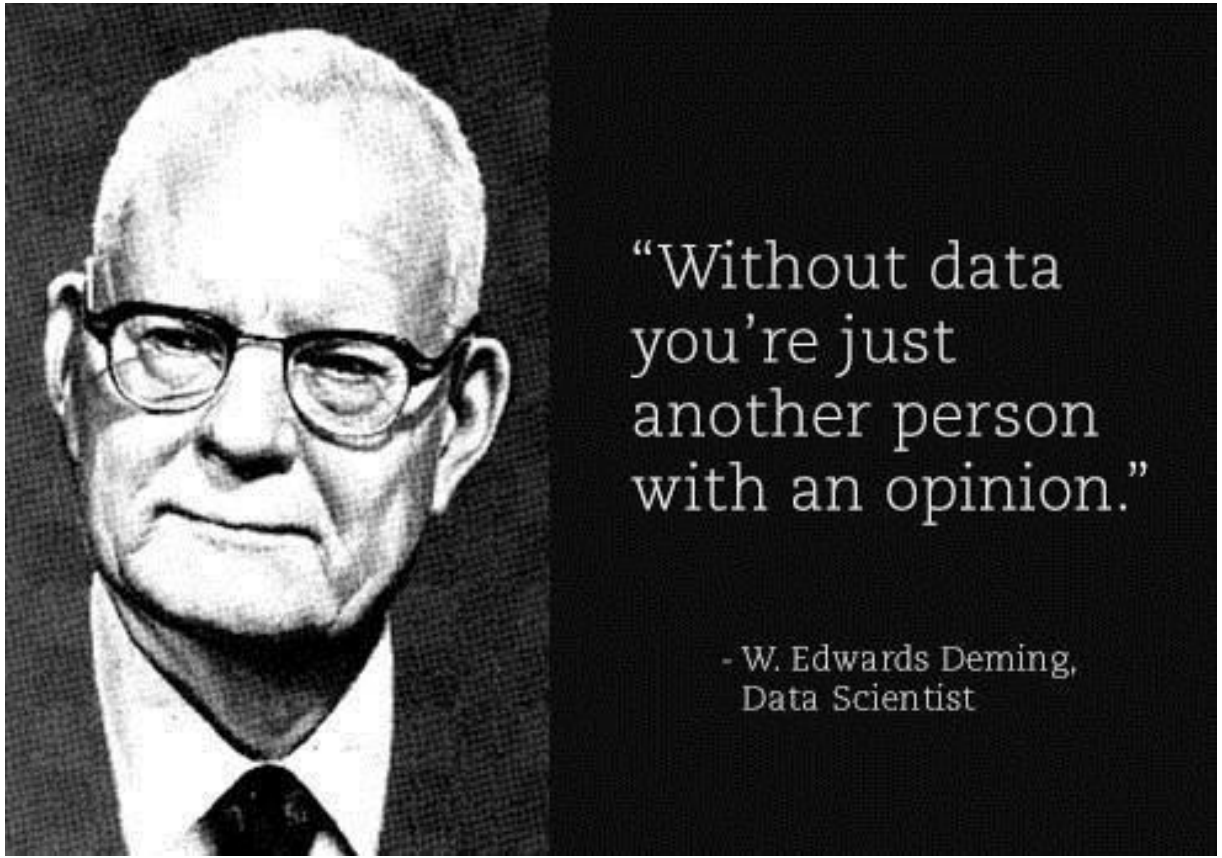

Angus Sire Benchmarking
Project sires n=436

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# Which would you pick to eat?




Photo Credit: Nicole Leighton


"Without data you're just another person with an opinion."
- W. Edwards Deming, Data Scientist





# Which would you pick to eat?




Photo Credit: Nicole Leighton

Measured Goats Project identifies three broader genetic groups: MEAT, F1 and RANGELAND.

# Which carcasses look better?

| HSCW | GOATS |
| --- | --- |
| 8.1kg + | $8.00 |

- Under 8.0kg = NCV






**Depends on the market!**

# Current Practice







# Future Practices



- Sex
- Age/dentition
- Weight
- Fatness/Yield





# Acknowledgements





# Why phenotype Goat carcasses?

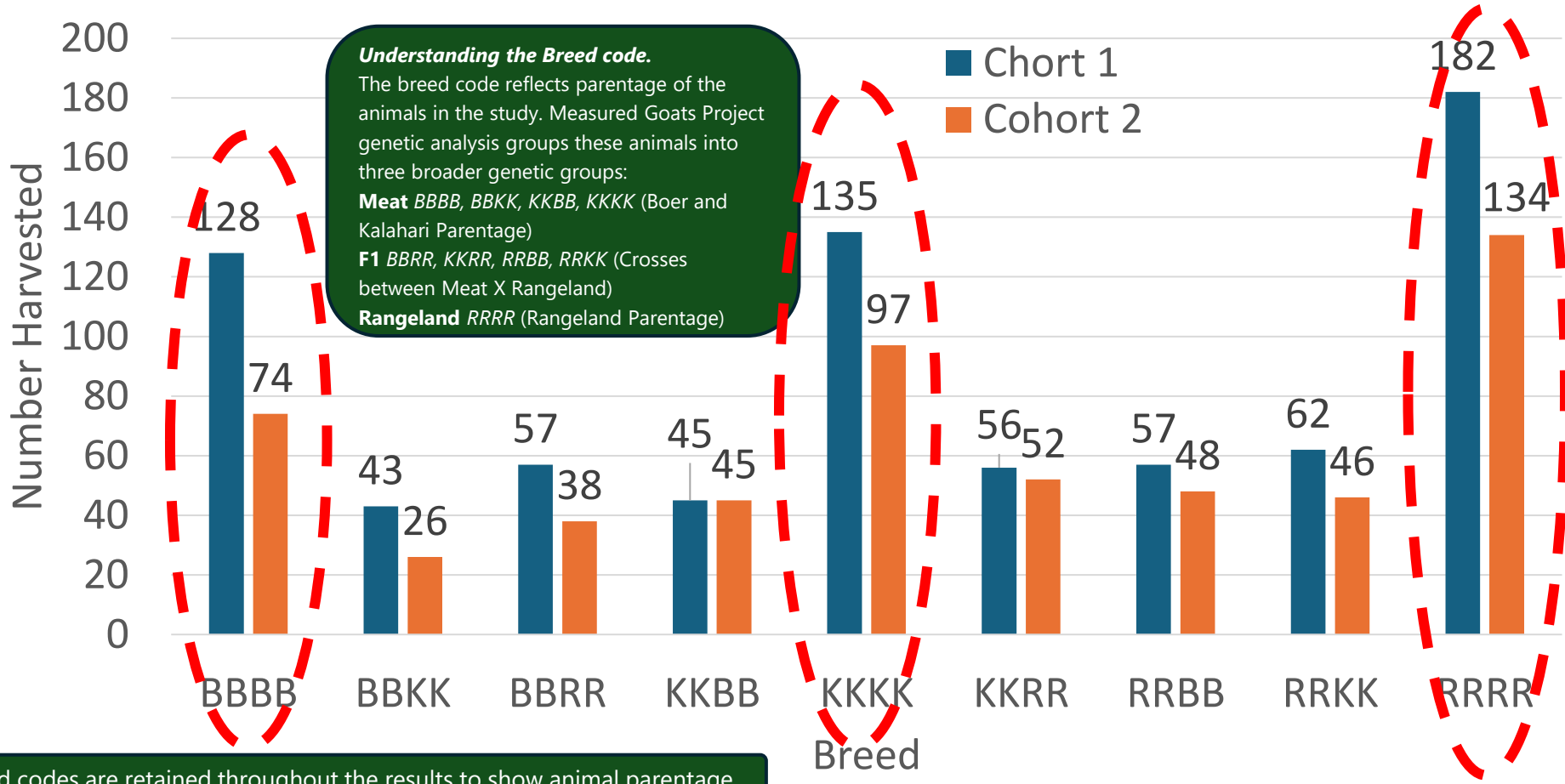
- Discover phenotypic & genetic diversity within & between breeds
- Understand impact of hybrid vigour
- Find animals that break unfavourable correlations between traits
- Generate breeding values for hard to measure carcass & meat traits
- Allow genomic prediction of traits in the future

**If you can't see it, you can't select for it!**





# Number Wethers Harvested




***Understanding the Breed code.***

The breed code reflects parentage of the animals in the study. Measured Goats Project genetic analysis groups these animals into three broader genetic groups:

**Meat** *BBBB, BBKK, KKBB, KKKK* (Boer and Kalahari Parentage)

**F1** *BBRR, KKRR, RRBB, RRKK* (Crosses between Meat X Rangeland)

**Rangeland** *RRRR* (Rangeland Parentage)

Breed codes are retained throughout the results to show animal parentage.

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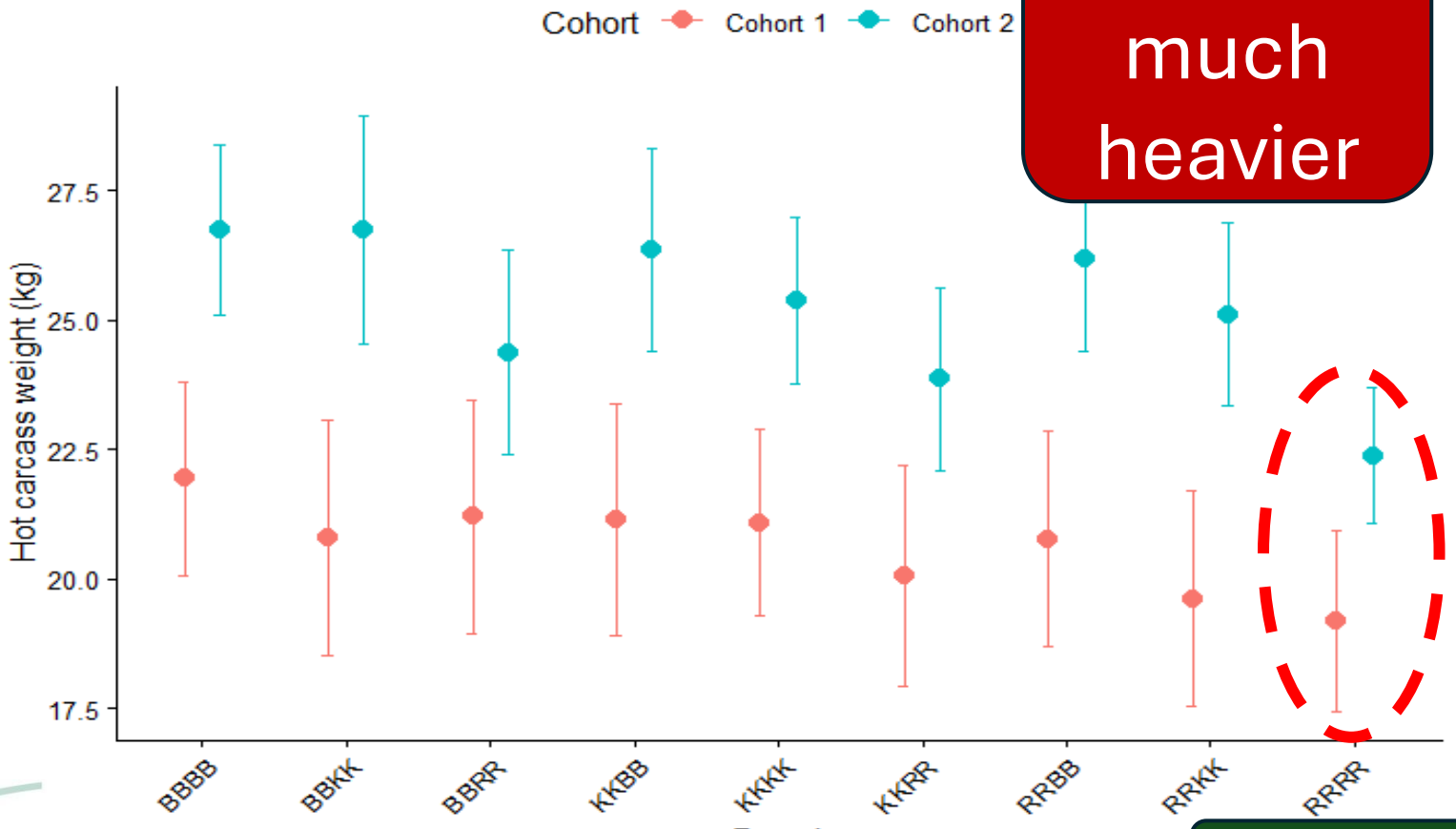





# Results

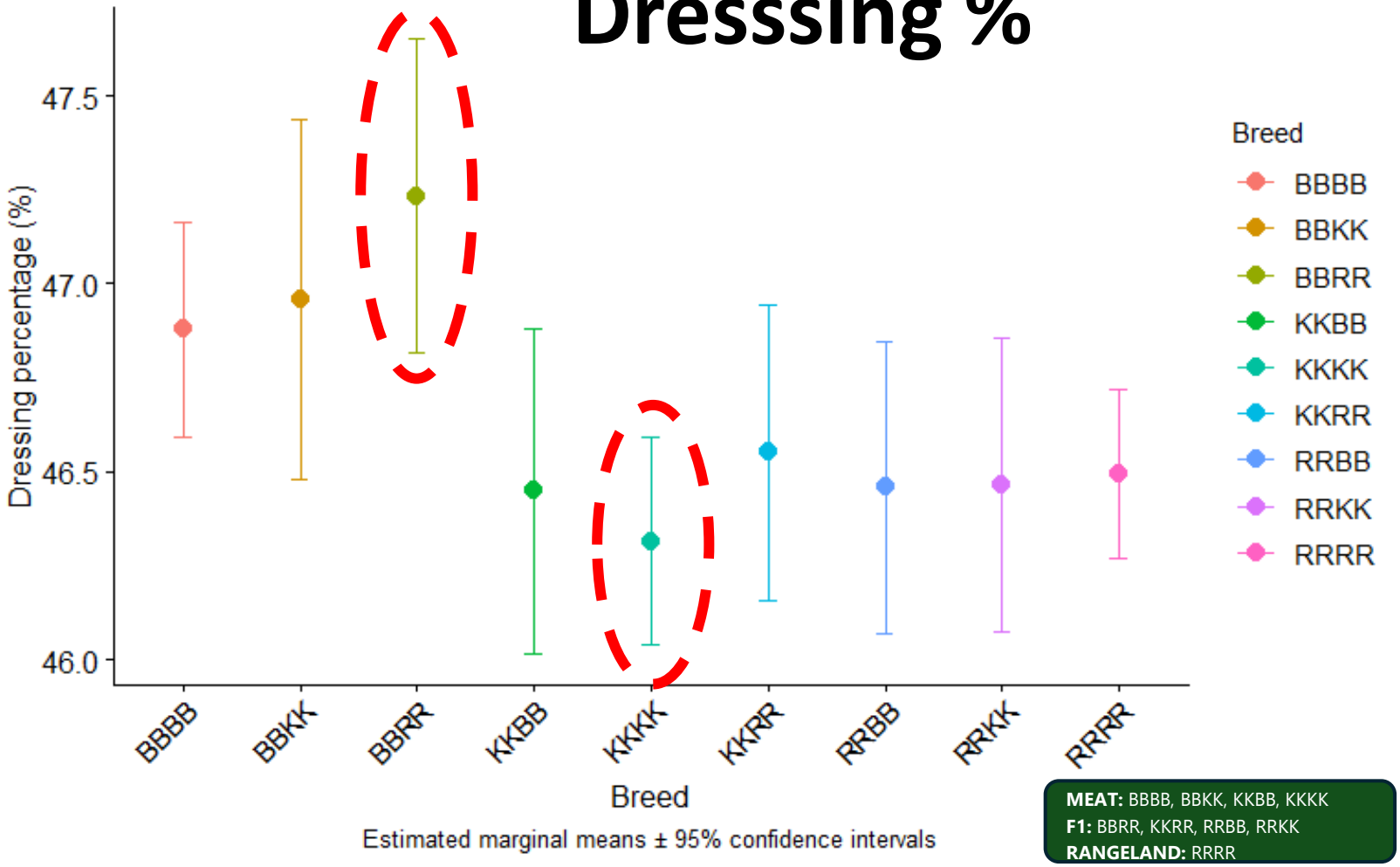
# Carcass Weight (kg)

Cohort 2 much heavier




**MEAT:** BBBB, BBKK, KKBB, KKKK
**F1:** BBRR, KKRR, RRBB, RRKK
**RANGELAND:** RRRR

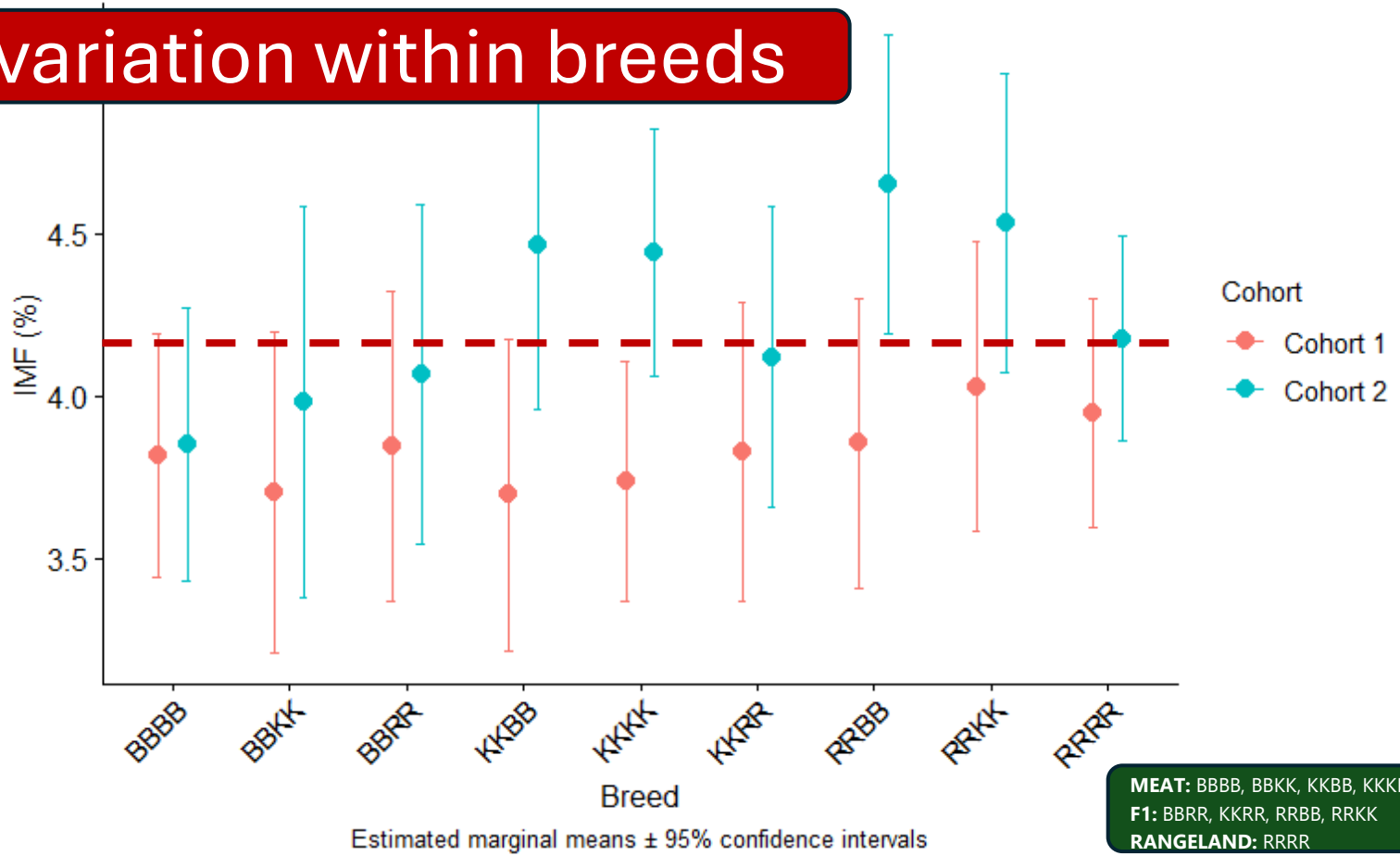
# Dresssing %




**MEAT:** BBBB, BBKK, KKBB, KKKK
**F1:** BBRR, KKRR, RRBB, RRKK
**RANGELAND:** RRRR

# Marbling % - IMF

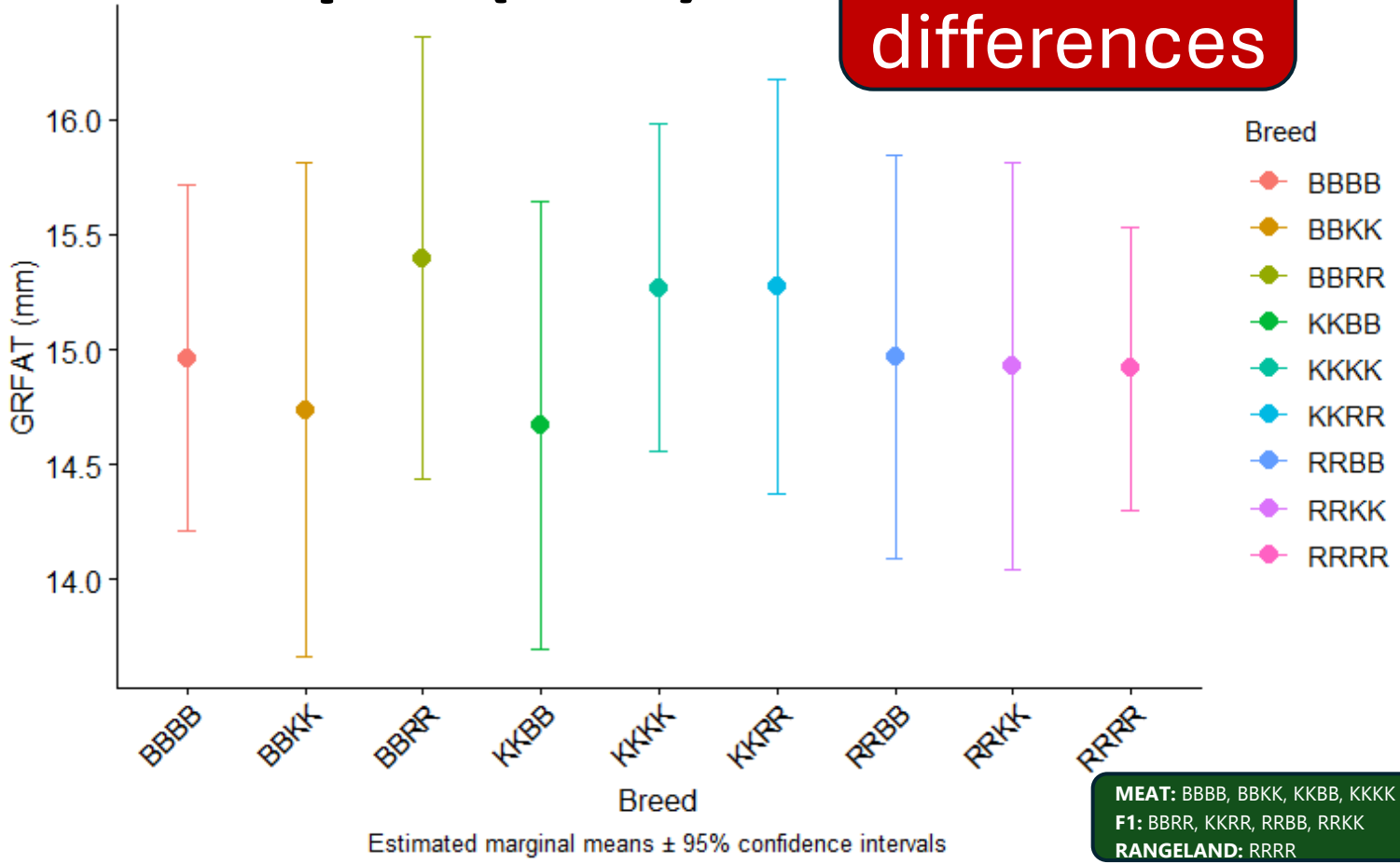
## Huge variation within breeds




**MEAT:** BBBB, BBKK, KKBB, KKKK
**F1:** BBRR, KKRR, RRBB, RRKK
**RANGELAND:** RRRR

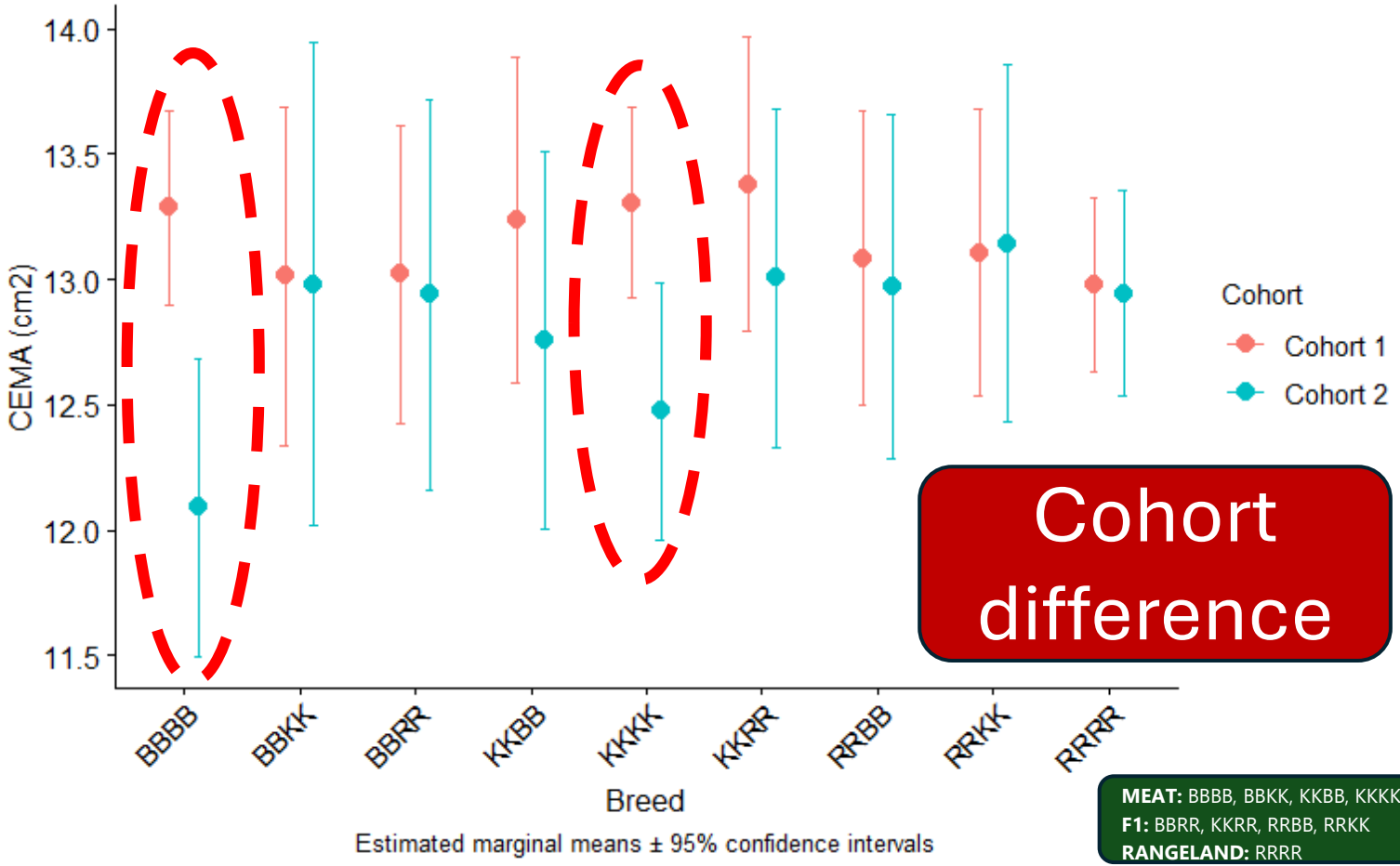
# GR Fat Depth (mm)

No differences

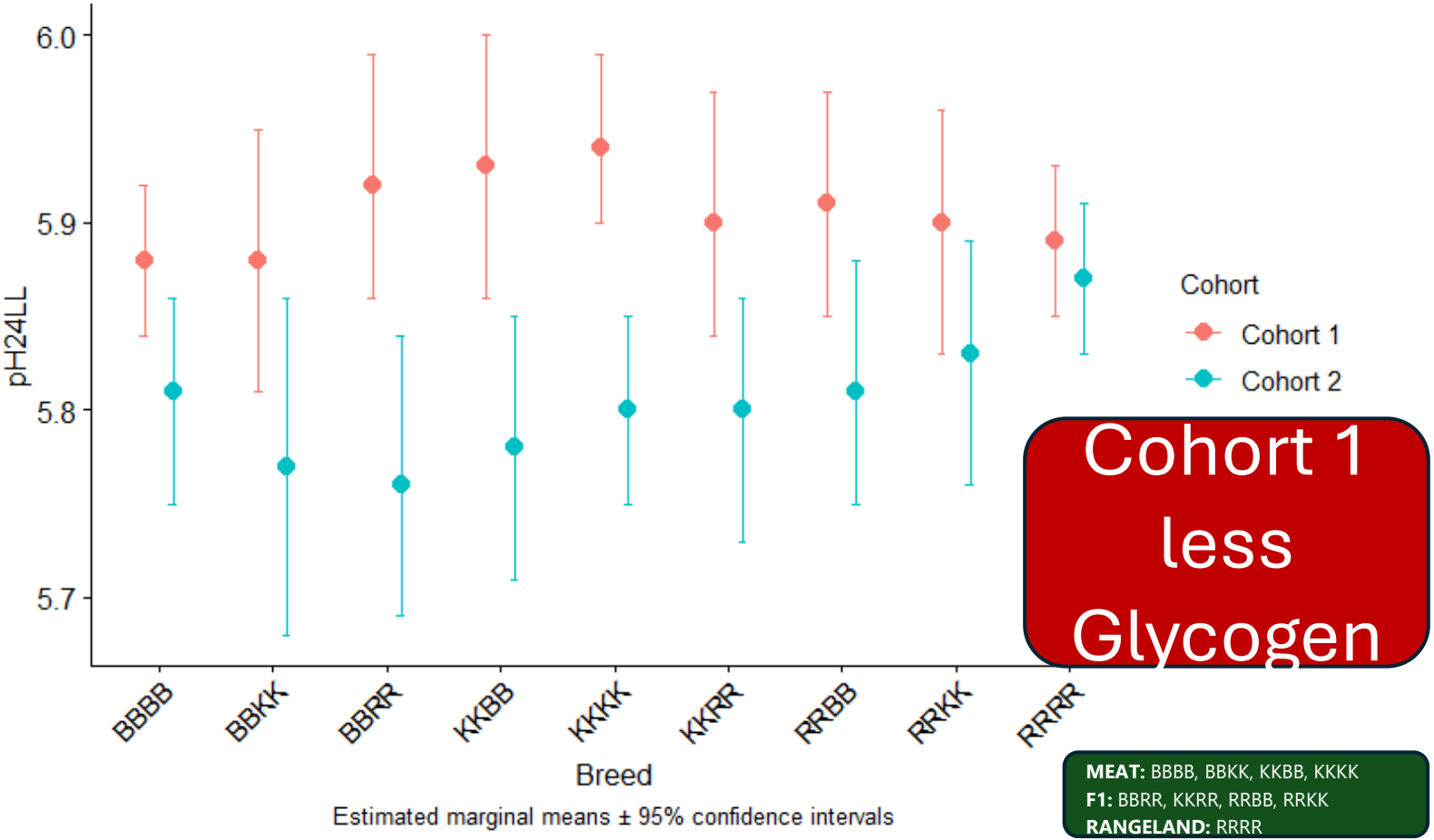



**MEAT:** BBBB, BBKK, KKBB, KKKK
**F1:** BBRR, KKRR, RRBB, RRKK
**RANGELAND:** RRRR

# Eye Muscle Area ($cm^2$)



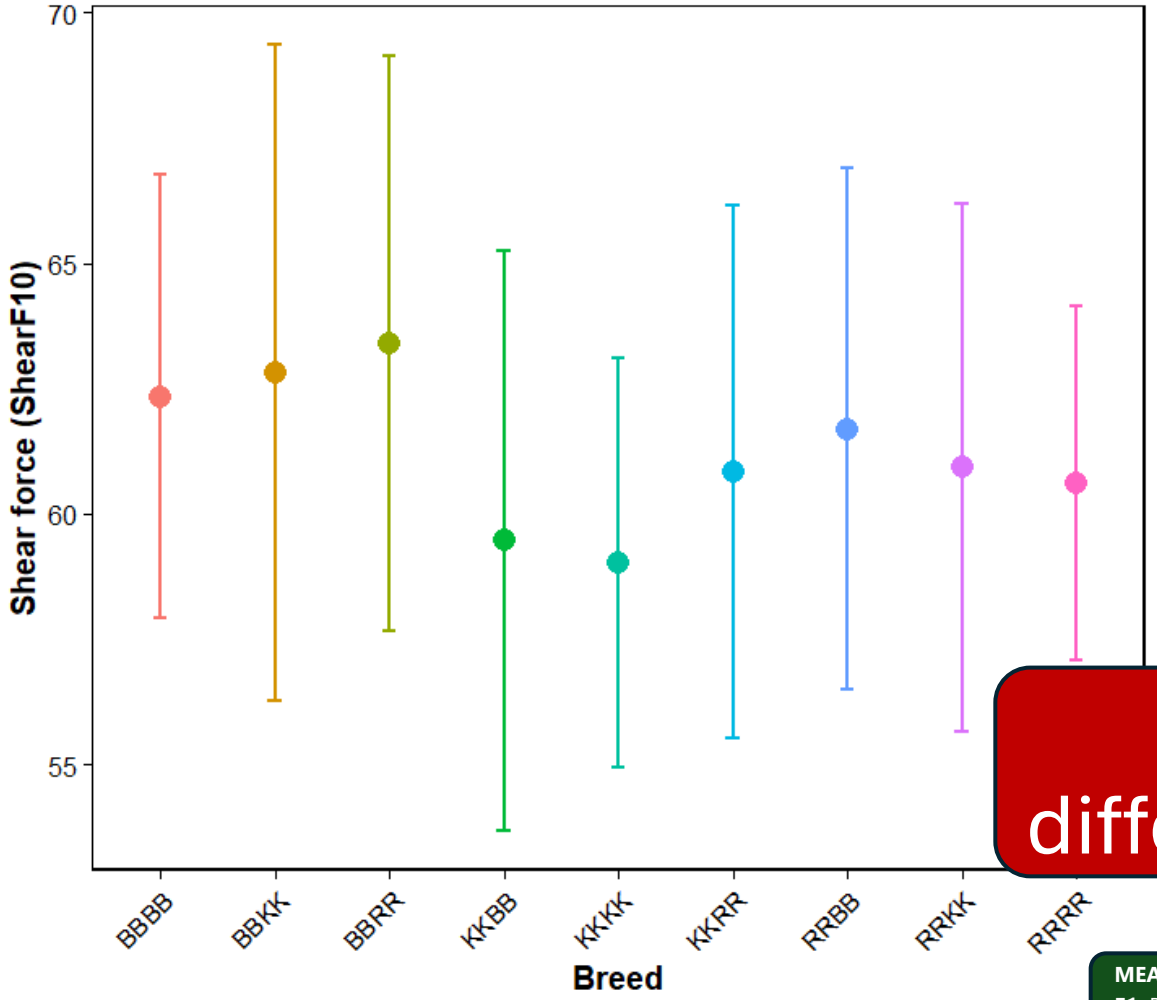
# Ultimate pH




Cohort 1 less Glycogen

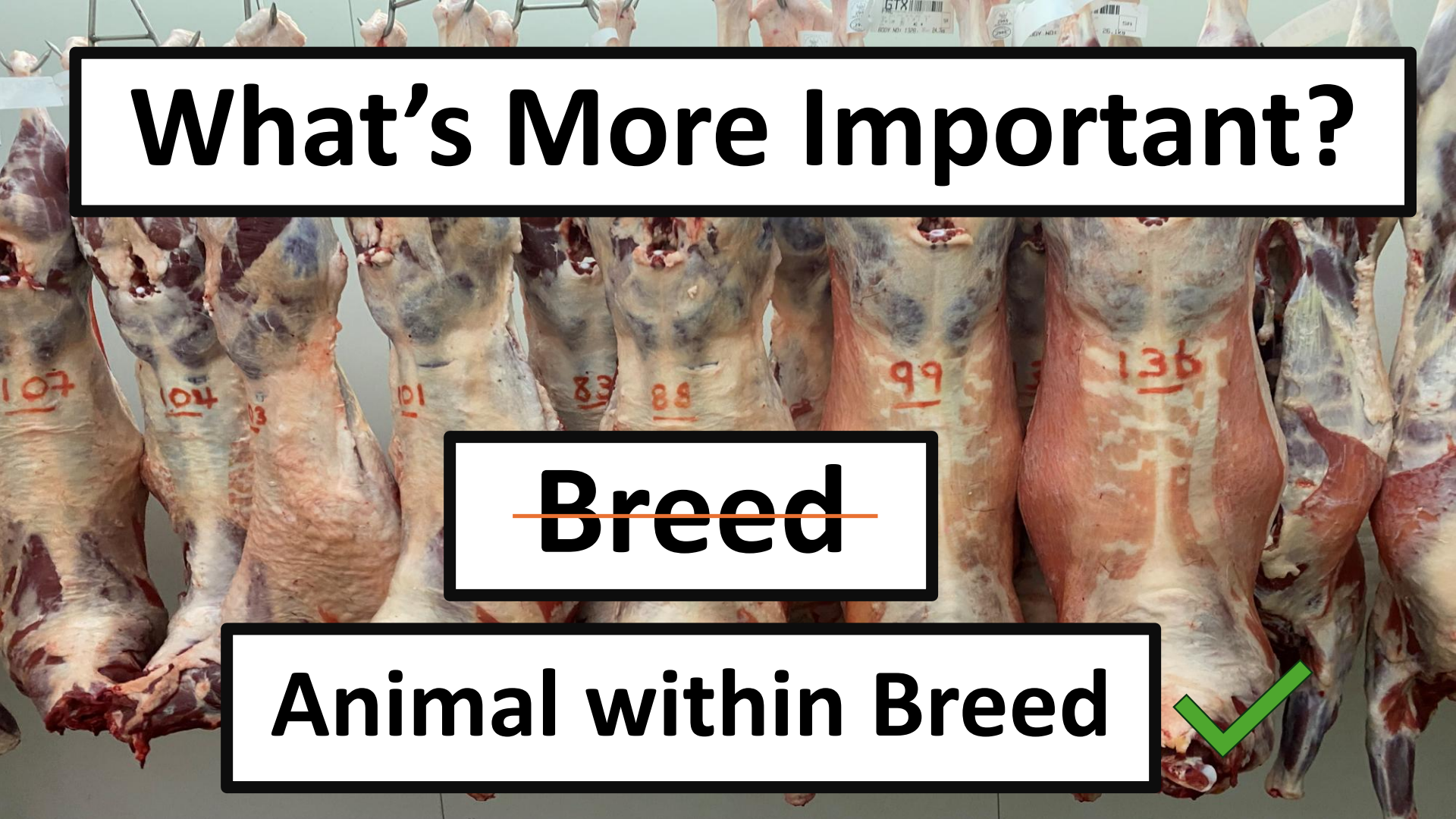
**MEAT:** BBBB, BBKK, KKBB, KKKK
**F1:** BBRR, KKRR, RRBB, RRKK
**RANGELAND:** RRRR

# Shear Force – 10 Days aged




No differences

**MEAT:** BBBB, BBKK, KKBB, KKKK
**F1:** BBRR, KKRR, RRBB, RRKK
**RANGELAND:** RRRR

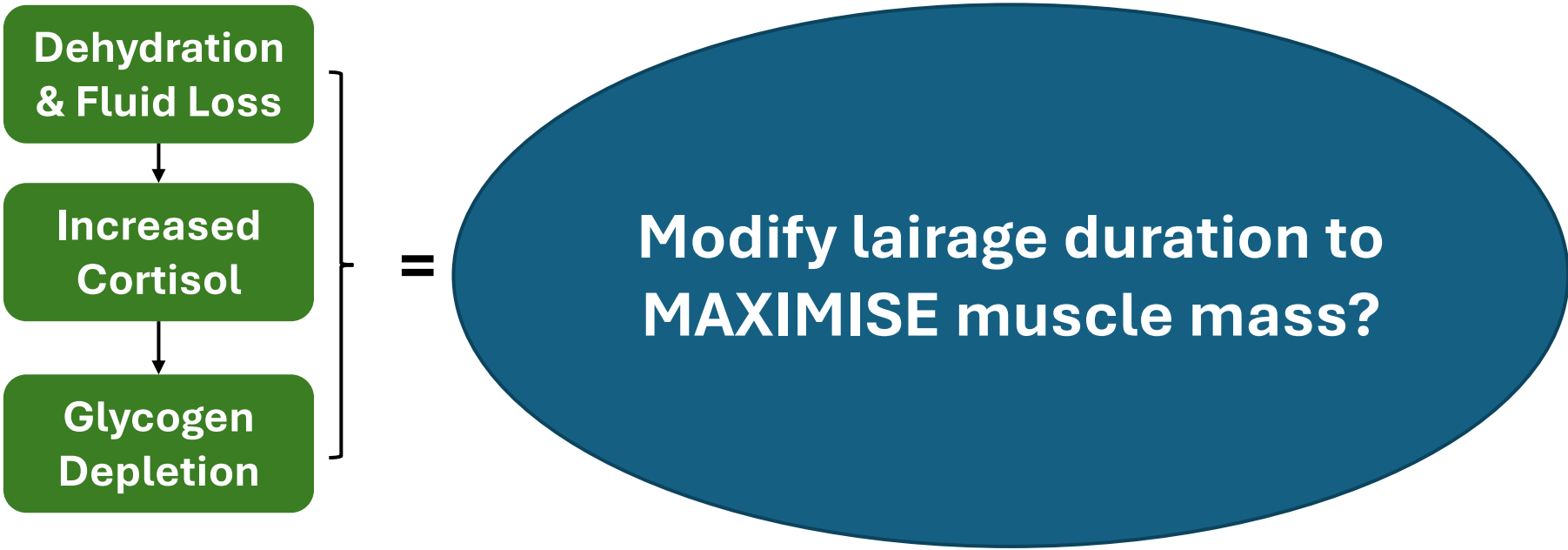

What's More Important?
~~Breed~~
Animal within Breed

# Does short duration lairage/less time off feed improve carcass weight?




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# Impact of Lairage or Time off feed



# Effluent on trucks?

- 4,943 heifers
- 4 durations of feed withdrawal at feedlot
  - 0, 4, 8 and 12 h
- 545 km journey
- First 268 km – 64% effluent was captured

| Variable | 0 h | 4 h | 8 h | 12 h | SE | P-value |
|---|---|---|---|---|---|---|
| Total Effluent captured per hd, kg/hd | 8.8 | 8.2 | 8.0 | 8.0 | 0.36 | 0.09 |

# Carcass weight Impact

- 24 hr off feed + curfew time
- No diff in carcass micro

1.8kg advantage

| Variable | 0 h | 4 h | 8 h | 12 h | SE | P-value |
|---|---|---|---|---|---|---|
| HSCW kg | 251.5$^{a}$ | 250.3$^{ab}$ | 250.4$^{ab}$ | 249.7$^{b}$ | 1.126 | 0.045 |

MLA final report (George et al., 2022)

# Does time off feed impact carcass weight?



# Guidelines for Preparing sheep & goats

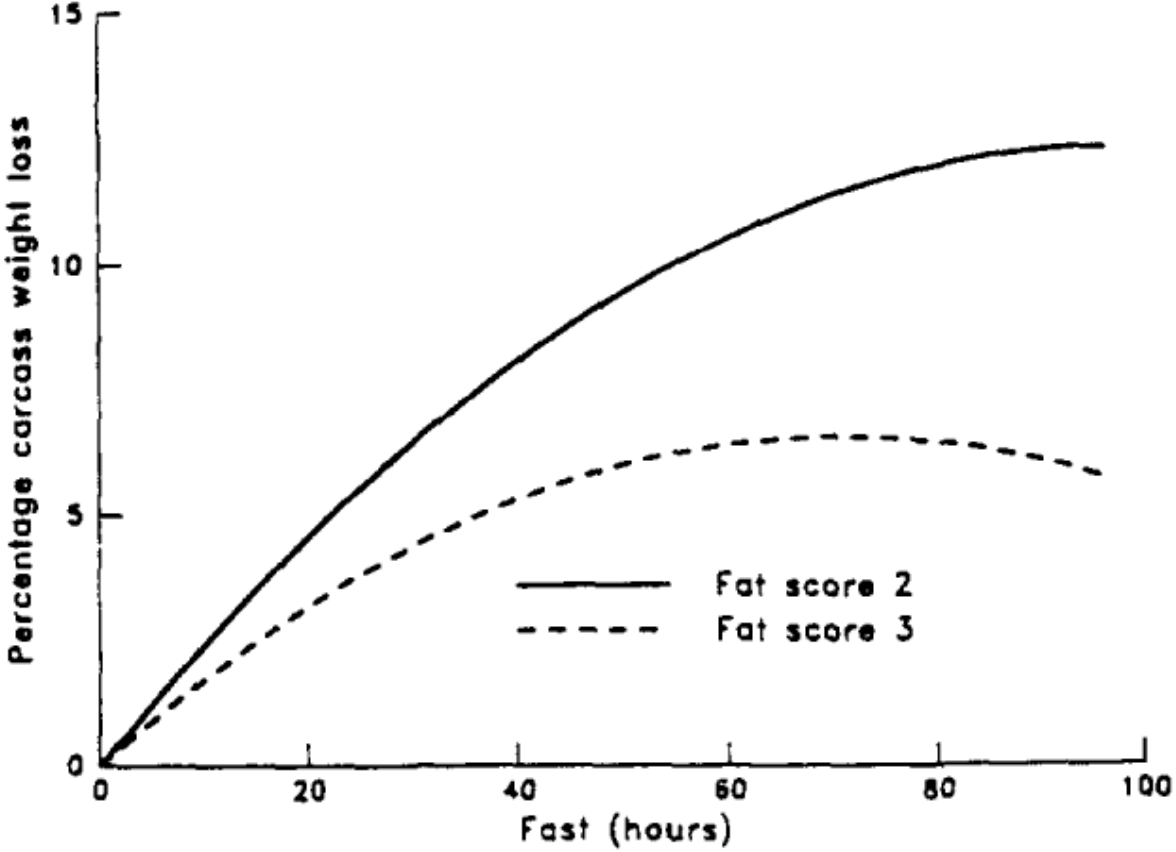
- **Off feed:** Take off lush green feed ahead of transport and feed ‘good quality’ dry hay or fibre to sustain them for the journey.

- **Off water:** 24–36 hours off water depending on the time of year e.g. less time in summer and more time in winter.

- **Separate on sex.** Ensure that the same weight, size and classes are put together

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# Time off feed with access to water

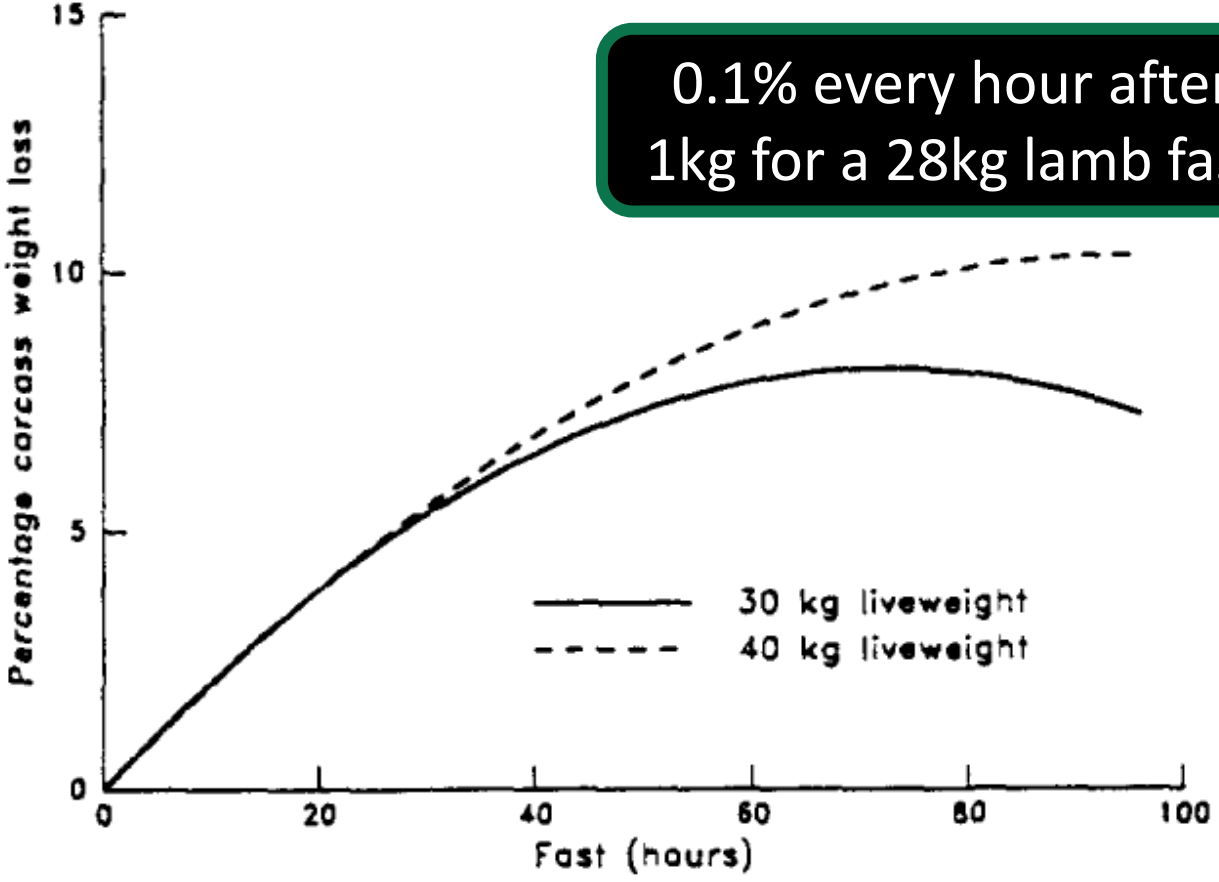



Thompson *et al.* 1987 Meat Science

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# Time off feed with access to water

0.1% every hour after 12 hours
1kg for a 28kg lamb fasted 48 hrs

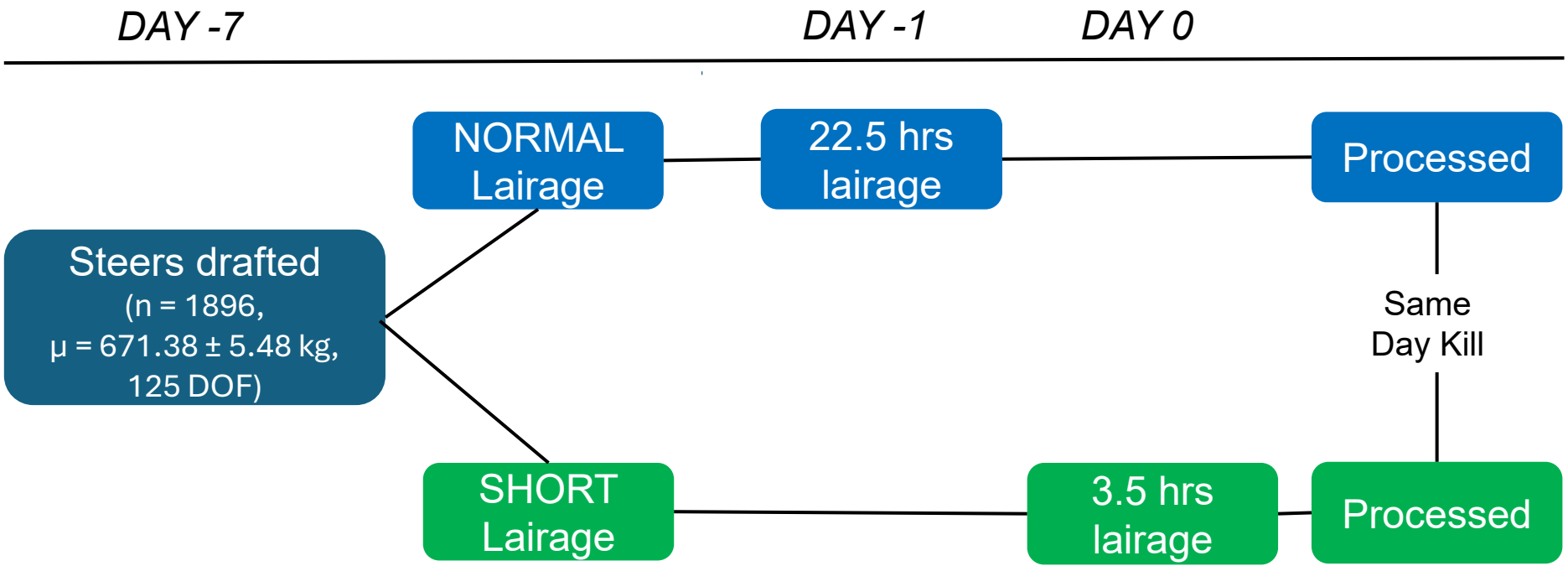



Thompson *et al.* 1987 Meat Science

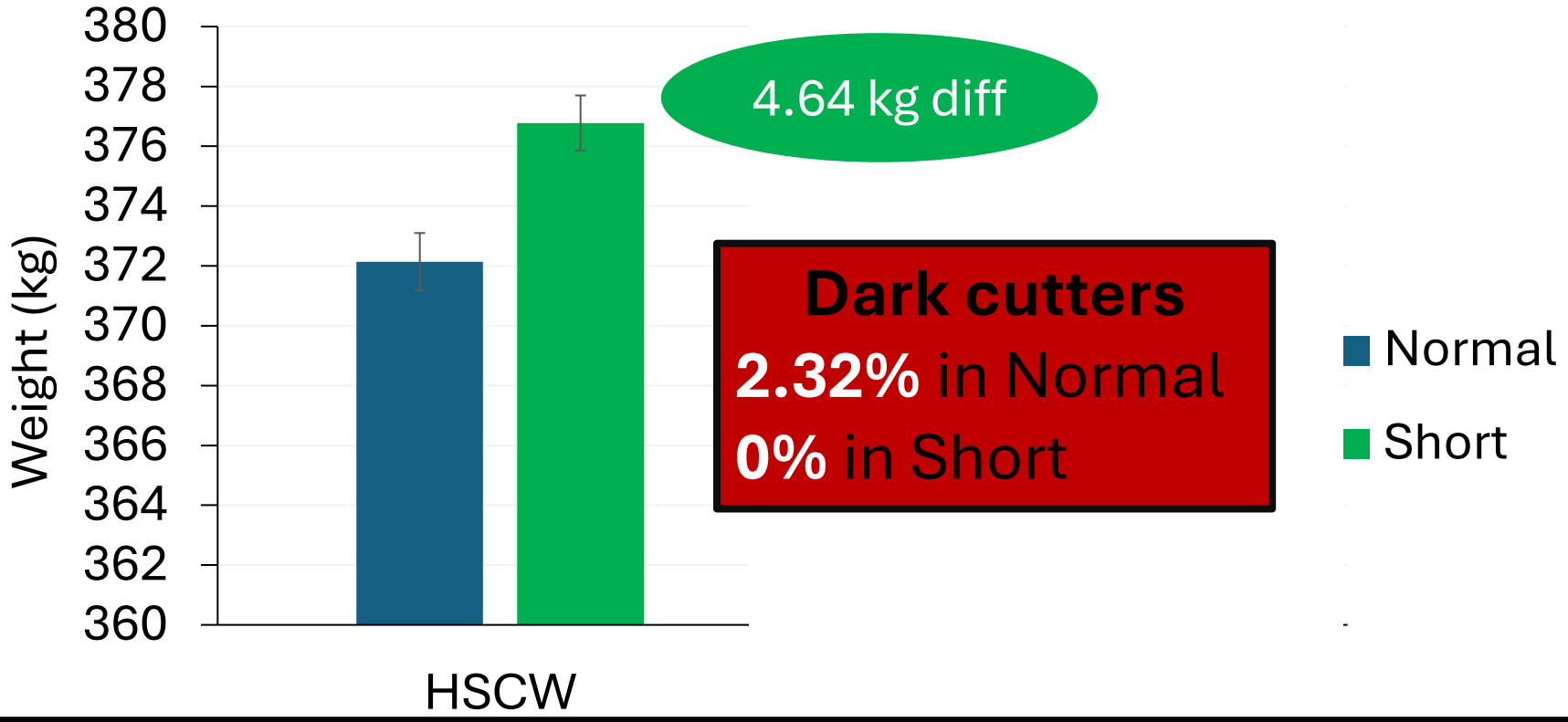
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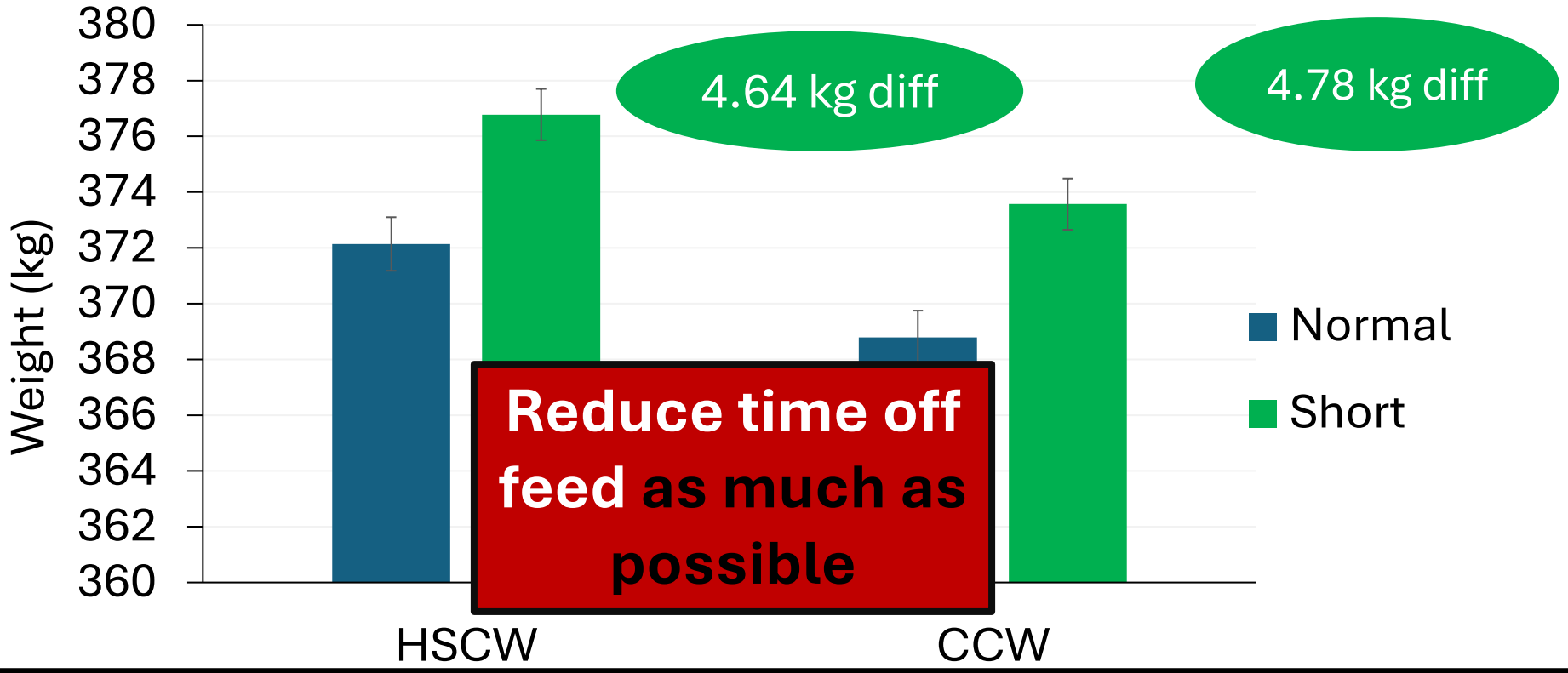
# Short Fed Export Market



# Weight – Short Fed Export Market



# Weight – Short Fed Export Market



# Take home messages

- Segregation of brands on quality paramount for industry $$$
- Selection of balanced genetics is pathway to ↑ progress!
- Greater variation within than between goat breeds for carcass & meat traits
- Reduce time off feed as much as possible = ↑ **HSCW**





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# Thankyou!

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# MLA and relevant tools and resources

- Profitable Grazing Systems
  - Building Better Breeders
  - Meat the Market
  - Grass to Dollars
- Bred Well Fed Well – Beef and Sheep
- Sheepgenetics.org.au – Lambplan, Kidplan & MerinoSelect
- MyFeedback & MyMSA

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