Does selection for lean meat yield reduce the sensory scores of Australian lamb?

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Outline

- The consumer matters
- Selection for Lean Meat Yield (LMY)
- How LMY affects consumer eating quality
Importance of Eating quality

- Drives repurchase intent and willingness to pay
- It’s a key driver of demand of lamb
Importance of Eating quality

- Drives repurchase intent and willingness to pay

- It’s a strong key driver of demand of lamb

Currently no way to select for it in lamb
Selection for lean meat yield

- Lean Meat Yield

Muscling + PEMD

Leaness - PFAT
Selection for lean meat yield

- Lean Meat Yield

IMF %

Shear Force
Challenges – Future focus

Balance 2 key consumer traits

- Lean Meat Yield
- Eating quality

- Tenderness
- Juiciness
- Flavour
- Overall Liking
Hypothesis

- Lean Meat Yield
- Eating quality
Hypothesis

- Lean Meat Yield
- Eating quality

IMF% \downarrow
SF5 \uparrow

Pannier et al., 2013
Hypothesis

- Lean Meat Yield
- Eating quality

Pannier et al., 2013
Information

Nucleus Flock
Design

8 production sites & ~100 sires per year
Design

8 production sites & ~100 sires per year
Consumer testing (n = 1471)

- Loin and Topside
- Tenderness (0 – 100)
- Juiciness
- Liking of flavour
- Odour
- Overall liking
Consumer testing

- Unsatisfactory
- Better than every day
- Good every day
- Premium

Real people (n = 5640) – real answers!
Statistical Analysis

Eating Quality Trait

Fixed Effects
- Site
- Year
- Sex
- Sire Type
- Dam Breed (ST)
- Kill Group (Site)
- Cut

Covariates
- PWT
- PFAT
- PEMD

Random
- Sire
- Dam

2yrs Data
Statistical Analysis

Eating Quality Trait

Carcase Breeding Values

Fixed Effects
- Site
- Year
- Sex
- Sire Type
- Dam Breed (ST)
- Kill Group (Site)
- Cut

Covariates
- PWT
- PFAT
- PEMD
- Sire
- Dam

2yrs Data
Statistical Analysis

Eating Quality Trait

2yrs Data

Fixed Effects:
- Site
- Year
- Sex
- Sire Type
- Dam Breed (ST)
- Kill Group (Site)
- Cut

Covariates:
- PWT
- PFAT
- PEMD
- IMF or SF

Random:
- Sire
- Dam
Phenotypic associations
IMF% increases EQ score

Loin

![Graph showing the relationship between Intramuscular Fat (%) and Eating quality score, with lines denoting Tenderness, Overall Liking, Flavour, and Juiciness.](image-url)
SF5 decreases EQ score

Eating quality score

Loin

- Tenderness
- Overall Liking
- Flavour
- Juiciness

Shear Force at day 5 (Newton)
Selection for lean meat yield

PFAT
Selection for PFAT reduces tenderness – Loin only

- 3.6 scores
Selection for PFAT reduces tenderness – Loin only

Magnitudes of the effect remains fairly similar when corrected for IMF or SF5
Selection for lean meat yield

PEMD
Selection for PEMD reduces tenderness, Ov.liking, flavour

Overall liking: -3.6
Flavour: -3.1
Selection for PEMD reduces tenderness, Ov. liking, flavour

Overall liking: -3.6
Flavour: -3.1
Hypothesis

- Lean Meat Yield
- Eating quality

IMF% ↓
SF5 ↑

Pannier et al., 2013
Selection for lean meat yield

- less juicy, less flavour & less tender

Pannier et al., 2013
Selection for lean meat yield

LMY is important

...But we need to protect eating quality

Pannier et al., 2013
Summary

- Relationship with IMF and EQ is linear
- Carefully monitor future selection for LMY
- Continuous selection for LMY will reduce EQ via PFAT, PEMD

Slow down further selection?
Summary

- Maintain selection pressure on LMY
- Develop a EQ Breeding Value ($h^2 = 0.3$)
  - Based on IMF, Shear Force
  - On-going consumer testing of sire progeny
Summary

- Keep **monitoring EQ** to assess direction of breeding programs

- **Develop a predicted EQ score** based on relationship with IMF, SF5
  - Up to 11 scores
  - Good predictor of sensory scores
Tenderness Loin

Sire variation

10 scores

Sire solutions

Maternal
Merino
Terminal

Sires
Fatness increases EQ

Eating quality score

- - - Tenderness

- - - - Overall Liking

- - - - Flavour

+ 1.6 - 3.0 scores
Muscling decreases EQ

- **Loin**
  - 3.4 - 7.0 scores

- **Topside**
  - 4.5 - 9.3 scores
Importance

5 pillars of consumer demand

- Integrity & Traceability
- Eating Quality
- Nutritional value
- Ethical systems
- Value & efficiency