Myoglobin and Iron in Lamb Meat

...the influence of lamb growth

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Why is lamb growth important?
Why is lamb growth important?
Meat Quality Traits

Myoglobin ≡ Meat colour

Myoglobin increases with age (Pethick *et al*, 2005)

Iron ≡ Nutrition

Source = 10%
Good Source = 25%
Meat Quality Traits

Myoglobin ≡ Meat colour

Myoglobin increases with age (Pethick et al, 2005)

Iron ≡ Nutrition

Source = 10%
Good Source = 25%
Does growth affect meat quality?

**Hot carcass weight**

- **Myoglobin**: 1.56 mg/g tissue (20kg) (Kelman et al, 2014)
- **Iron**: 0.23 mg/100g (27kg) (Pannier et al, 2014)

- Lamb growth is linear
- Varies with age
The association between lamb growth and myoglobin and iron will vary during different periods of growth (Gardner et al, 2007)
Investigation

Information Nucleus Flock

- Eight sites
- 2007 – 2011
- Maternal, Merino and Terminal sires
Investigation

Lamb weights

- Birth
- 100 days (weaning)
- 150 days (post weaning)
Investigation

Myoglobin and Iron

- Myoglobin (n=8,987)
- Iron (n=8,434)
Investigation

Statistical Analysis: Linear Mixed Effects Model

Fixed: Site, Year, Birth type-rear type, Dam age, Sire type, Sex, Dam breed (Sire type), Kill group (Site*Year)

Random: Sire, Dam*Year

Covariates: Birth weight or Weight at 100 or Weight at 150
Results

Myoglobin

Myoglobin (mg/g tissue)

Weight 150 days (kg)

1.81
Myoglobin

Results

Myoglobin (mg/g tissue)

Weight 100 days (kg)  Weight 150 days (kg)

2.30  1.81
Results

Myoglobin

- Birth weight (kg): -1.22
- Weight 100 days (kg): 2.30
- Weight 150 days (kg): 1.81
Results

Myoglobin

- 1.22
- 2.30
- 1.81

*Hot carcass weight association 1.56 mg/g tissue*
Results

Iron

<table>
<thead>
<tr>
<th>Weight 150 days (kg)</th>
<th>Iron (mg/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.23</td>
<td>0.23</td>
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</tbody>
</table>

Weight 150 days (kg)

Iron (mg/100g)
Results

Iron

Iron (mg/100g)

Weight 100 days (kg)  Weight 150 days (kg)

0.26  0.26

0.23  0.23

0  0

20  20

40  40

60  60

80  80

1.5  1.5

2  2

2.5  2.5

Iron (mg/100g)
Results

Iron

<table>
<thead>
<tr>
<th>Iron (mg/100g)</th>
<th>Birth weight (kg)</th>
<th>Weight 100 days (kg)</th>
<th>Weight 150 days (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.25</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>0.26</td>
<td>2</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td>0.23</td>
<td>2</td>
<td>2.5</td>
<td>2</td>
</tr>
</tbody>
</table>

Birth weight (kg) | Weight 100 days (kg) | Weight 150 days (kg)
Results

Iron

Hot carcass weight association 0.23 mg/100g
Hypothesis

Myoglobin

with lamb growth

*only after 100 days

Iron

with lamb growth

*only after 100 days

➢ The association between lamb growth and myoglobin and iron will vary during different periods of growth

✓
Possible mechanisms: Time from slaughter and growth impetus

Myoglobin and Iron can be influenced EARLY
Future Investigations

- Investigation of a greater range of meat traits
- Characterise the change in association between birth and weaning and investigate mechanisms
- Association after 150 days (e.g. 240)
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Thank you