Maternal index review 2016
Maternal index survey

• Aims:
  1. Collect data on commercial production systems in which maternal breeds are used
  2. Better understanding of issues related to breeding directions

• Contacted 120 current maternal LAMBPLAN members in early 2016

• 26 responses:
  – 11 Border Leicester (BL)
  – 11 Maternal Composites (CM)
  – 4 Composite “Shedders” (CS)
### Survey results: commercial breeding flock

<table>
<thead>
<tr>
<th></th>
<th>BL</th>
<th>CM</th>
<th>CS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fertility (conception rate) %</strong></td>
<td>76</td>
<td>86</td>
<td>81</td>
</tr>
<tr>
<td><strong>Scanning %</strong></td>
<td>186</td>
<td>171</td>
<td>139</td>
</tr>
<tr>
<td><strong>Weaning %</strong></td>
<td>131</td>
<td>144</td>
<td>118</td>
</tr>
<tr>
<td><strong>Ewes mated as yearlings (Y:N)</strong></td>
<td>40:60</td>
<td>80:20</td>
<td>75:25</td>
</tr>
<tr>
<td><strong>Mature ewe weight</strong></td>
<td>67</td>
<td>71</td>
<td>65</td>
</tr>
</tbody>
</table>
Survey results: “straight-bred” lambs

<table>
<thead>
<tr>
<th></th>
<th>BL*</th>
<th>CM</th>
<th>CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale age (months)</td>
<td>7.1</td>
<td>5.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Sale weight (kg)</td>
<td>50.3</td>
<td>45.6</td>
<td>45.7</td>
</tr>
<tr>
<td>Carcass weight (kg)</td>
<td>23.2</td>
<td>21.1</td>
<td>21.7</td>
</tr>
<tr>
<td>Carcass price ($/kg)</td>
<td>5.4</td>
<td>5.2</td>
<td>4.8</td>
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</table>
## Survey results: terminal cross lambs

<table>
<thead>
<tr>
<th></th>
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<th>CS</th>
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</thead>
<tbody>
<tr>
<td>Sale age (months)</td>
<td>4.4</td>
<td>4.3</td>
<td>6.0</td>
</tr>
<tr>
<td>Sale weight (kg)</td>
<td>41.9</td>
<td>46.3</td>
<td>50.0</td>
</tr>
<tr>
<td>Carcass weight (kg)</td>
<td>22.5</td>
<td>21.7</td>
<td>25.0</td>
</tr>
<tr>
<td>Carcass price ($/kg)</td>
<td>5.5</td>
<td>5.1</td>
<td>4.5</td>
</tr>
</tbody>
</table>
### Survey results: wool production and price

<table>
<thead>
<tr>
<th></th>
<th>BL</th>
<th>CM</th>
<th>CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean fleece weight (kg)</td>
<td>3.8</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Wool price (cents/kg)</td>
<td>820</td>
<td>570</td>
<td></td>
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</tbody>
</table>
The importance of mature ewe size

• Increasing mature ewe weight is a concern in commercial flocks:
  – Larger ewes eat more feed and are more difficult to handle

• Has occurred often as a correlated change due to:
  – Selection to increase early growth
  – Small positive correlation with female reproduction

• Survey question:
  – Reducing adult ewe weight is of high importance...

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<tbody>
<tr>
<td>BL</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>CM</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>CS</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Other issues

• Use of terminal sires in self-replacing maternal flocks:
  – Increased enterprise efficiency → sire line selected for growth and carcass, maternal line selected for female traits
  – CM → majority of responses indicated 25 – 50% of commercial flock mated to terminal sires
  – CS → less important (None, or 0 – 25%)

• Importance of internal parasites:
  – CM → 60% of responses rated parasites as significant or very significant
  – Less important for BL and CS
Three new breeding objectives

BLX = Border Leicester crossing system

CMDP = Commercial Maternal Dual Purpose

CMC = Commercial Maternal Carcass
BLX enterprise

• Border Leicester sires mated to Merino ewes:
  – Male offspring sold as lambs
  – Female offspring joined as F1 ewes

• F1 ewes mated to terminal sires:
  – First lamb at 2y.o., retained for 5 joinings
  – 120% weaning rate
  – March joining – October weaning
  – Limited feed period November to August
  – Mature ewe weight = 67kg
  – Lamb sale weight = 50kg
  – Carcass price = $5.50, and eye muscle premium of 20c/mm
  – Ewe clean fleece weight = 3.8kg, price = 800c/kg
CMDP enterprise

• Self-replacing dual purpose flock:
  – 30% of ewes mated to terminal sire
  – First lamb at 1y.o., retained for 6 joinings
  – 120% weaning rate
  – March joining – October weaning
  – Limited feed period November to August
  – Mature ewe weight = 72kg
  – Lamb sale weight = 46kg
  – Carcass price = $5.20, and eye muscle premium of 20c/mm
  – Ewe clean fleece weight = 3.7kg, price = 570c/kg
  – Reduction of WEC included in breeding objective
• Self-replacing meat flock (no wool income):
  – First lamb at 1y.o., retained for 6 joinings
  – 120% weaning rate
  – March joining – October weaning
  – Limited feed period November to August
  – Mature ewe weight = 65kg
  – Lamb sale weight = 45kg
  – Carcass price = $4.80, and eye muscle premium of 20c/mm
  – No mating to terminal sire
  – WEC not included
Indexes

• Indexes developed for each objective:
  – BLX
  – CMDP
  – CMC

• Plus variants for each in which change in mature ewe weight has been additionally restricted:
  – BLX2 = no change in AWT
  – CMDP2 = reduction of -1kg in AWT over 10 years
  – CMC2 = no change in AWT

Need to measure AWT in breeding ewes to effect these changes
BLX trait emphasis with gains over 10 years

### BLX

- **PWT**: 4.3kg
- **MWWT**: 1.5kg
- **AWT**: 3.7kg
- **EMD**: 0.5mm
- **NLW**: 4.6%
- **CFW**: 1.9%

### BLX2

- **PWT**: 2.9kg
- **MWWT**: 1.7kg
- **AWT**: 0kg
- **EMD**: 0.7mm
- **NLW**: 3.4%
- **CFW**: 1.3%
BLX indexes: sires used post-2010

Trait means for top 10% of sires

<table>
<thead>
<tr>
<th></th>
<th>BWT</th>
<th>WWT</th>
<th>PWT</th>
<th>AWT</th>
<th>MWWT</th>
<th>PEMD</th>
<th>PFAT</th>
<th>NLW</th>
<th>YGFW</th>
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<tbody>
<tr>
<td>BLX</td>
<td>0.1</td>
<td>2.0</td>
<td>3.5</td>
<td>3.8</td>
<td>0.1</td>
<td>0.55</td>
<td>0.23</td>
<td>7</td>
<td>1.9</td>
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<tr>
<td>BLX2</td>
<td>0.1</td>
<td>1.4</td>
<td>2.8</td>
<td>2.2</td>
<td>0.3</td>
<td>0.61</td>
<td>0.28</td>
<td>8</td>
<td>1.8</td>
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<tr>
<td>MATDOL</td>
<td>0.1</td>
<td>2.0</td>
<td>3.5</td>
<td>3.9</td>
<td>0.0</td>
<td>0.51</td>
<td>0.25</td>
<td>8</td>
<td>1.7</td>
</tr>
<tr>
<td>Mean</td>
<td>0.2</td>
<td>3.7</td>
<td>5.8</td>
<td>7.9</td>
<td>0.4</td>
<td>0.11</td>
<td>-0.22</td>
<td>4</td>
<td>4.5</td>
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CMDP trait emphasis and 10 year gains

**CMDP**

- **PWT**: 4.2kg
- **MWWT**: 0.8kg
- **AWT**: 3.3kg
- **EMD**: 0.7mm
- **NLW**: 3.7%
- **WEC**: -37.1%
- **CFW**: 0.4%

**Economic gain (%)**

- 0
- 20
- 40
- 60

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**CMDP2**

- **PWT**: 2.4kg
- **MWWT**: 0.9kg
- **AWT**: -1kg
- **EMD**: 0.9mm
- **NLW**: 2.1%
- **WEC**: -40.2%
- **CFW**: -0.5%

**Economic gain (%)**

- 0
- 20
- 40
- 60
### CMDP indexes: sires used post-2010

#### Trait means for top 10% of sires

<table>
<thead>
<tr>
<th></th>
<th>WWT</th>
<th>PWT</th>
<th>AWT</th>
<th>MWWT</th>
<th>PEMD</th>
<th>PFAT</th>
<th>NLW</th>
<th>PWEC</th>
<th>YGFW</th>
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<tbody>
<tr>
<td>CMDP</td>
<td>1.1</td>
<td>2.3</td>
<td>2.6</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMDP2</td>
<td>0.6</td>
<td>1.5</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATDOL</td>
<td>0.8</td>
<td>1.8</td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
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<th>AWT</th>
<th>MWWT</th>
<th>PEMD</th>
<th>PFAT</th>
<th>NLW</th>
<th>PWEC</th>
<th>YGFW</th>
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<tbody>
<tr>
<td>Mean</td>
<td>7.1</td>
<td>10.7</td>
<td>12.6</td>
<td>-0.1</td>
<td>0.83</td>
<td>-0.47</td>
<td>5</td>
<td>-13</td>
<td>3.7</td>
</tr>
</tbody>
</table>

#### Diagram:
- **Commercial Maternal sires (n=821)**
  - Graphs showing correlations and distribution of traits for CMDP, CMDP2, and MATDOL.
  - Correlations: 0.924, 0.931, 0.844

This analysis provides insights into the performance of top sires in terms of various maternal traits.
CMC trait emphasis and 10 year gains

**CMC**

- NLW
- EMD
- AWT
- MWWT
- PWT

0 20 40 60 80
Economic gain (%)

4.8kg
0.9kg
3.3kg
0.7mm
3.7%

**CMC2**

- NLW
- EMD
- AWT
- MWWT
- PWT

0 20 40 60 80
Economic gain (%)

3.5kg
1kg
0kg
0.8mm
2.6%
CMC indexes: sires used post-2010

### Trait means for top 10% of sires

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<thead>
<tr>
<th></th>
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<th>MWWT</th>
<th>PEMD</th>
<th>PFAT</th>
<th>NLW</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMC</td>
<td>0.1</td>
<td>1.3</td>
<td>2.5</td>
<td>2.8</td>
<td>0.8</td>
<td>0.57</td>
<td>0.12</td>
<td>6</td>
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<tr>
<td>CMC2</td>
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<td>0.9</td>
<td>1.9</td>
<td>1.4</td>
<td>0.7</td>
<td>0.74</td>
<td>0.26</td>
<td>6</td>
</tr>
<tr>
<td>MATDOL</td>
<td>0.0</td>
<td>0.8</td>
<td>1.8</td>
<td>2.6</td>
<td>0.7</td>
<td>0.27</td>
<td>0.02</td>
<td>10</td>
</tr>
<tr>
<td>Mean</td>
<td>0.5</td>
<td>7.1</td>
<td>10.7</td>
<td>12.6</td>
<td>-0.1</td>
<td>0.83</td>
<td>-0.47</td>
<td>5</td>
</tr>
</tbody>
</table>
Summary

• New indexes based on breeder data for commercial production

• Not hugely different to current indexes

• But, restricting change in mature ewe weight causes larger differences

• Future strategy for maternal index implementation:
  – Production system based breeding objectives (BLX, CMDP, CMC)
  – Design indexes to meet these objectives
  – Indexes can change according to needs and new information