Lamb survival & ewe longevity

Ann McLaren, Karolina Kaseja, Kirsty Moore, Sebastian Mucha, Cathy Dwyer

Joanne Conington

SBRT 2015

Leading the way in Agriculture and Rural Research, Education and Consulting
They are in this audience!

Ann McLaren

Karolina Kaseja
Lamb mortality ~15% last 45 years!

Dwyer et al. 2015 Improving neonatal survival in small ruminants – science into practice. Animal.
Research in lamb mortality

Why aren’t we making any progress in reducing lamb mortality?
Take home messages SBRT 2013

Using national Scottish Blackface data...

Male lambs and lambs from older ewes have higher mortality
Females have higher survival

\[ lcl = 0.70, \ ucl = 0.79, \ s.e.d. = 0.03 \]
Lambs from young and older ewes have lower survival
Managing multiple litters well, is key to avoiding higher rate of death
Survival rate differs acc. litter size

Preferential treatment of twins in hill flocks?
Take home messages SBRT 2013

Getting birth weight ‘right’, is critical to increase lamb survival
Lamb birth weight and mortality

National records - Blackface breed n= 173,895 lamb records 1976 - 2011
Lamb survival has low heritability (<10%)
Other breeds?

- Blackface ✓
- Texel
- Lleyn
- Dorset
National data used – Signet & BASCO

• Lleyn n= 51,174  2002-2013  47 flocks
• Dorset n= 15,433  2002-2013  20 flocks
• Texel n=48,995  2002-2013  108 flocks
Data recording issues

- Not many birth weights
  - Could insist that if you want survival EBVs then birth weights are required
- Some years, some flocks had 0% lamb losses
- Some years, some flocks, had > 90% lamb losses
- Data quality poor!
  - Lambs born dead not recorded?
Definition of lamb survival?

Measurement opportunities are limited

- Birth
- Mid-lactation ~8 wks
- Weaning ~20 wks
- ~8 wks
Lamb survival

- Percent recorded as dead

![Bar chart showing lamb survival rates for Blackface, Lleyn, Dorset, and Texel breeds.]
Heritability 5 – 9 %
‘Take home’ messages the same!

- Lamb deaths higher in males vs females – all breeds

% dead

- Balckface
- Lleyn
- Dorset
- Texel

**Graph:**
- X-axis: Breeds (Balckface, Lleyn, Dorset, Texel)
- Y-axis: % dead
- Bars represent male and female percentages.
Implications?

• Lamb survival is heritable and can be used in sheep breeding programmes

• Data quality poor - better ways to encourage dead lambs to be recorded, required?

If we do, $h^2$ will increase faster genetic progress
Ewe longevity as a breeding goal in sheep breeding programmes

A McLaren, S Mucha, K. Kaseja, K. Moore, J. Conington
Ewe longevity

• How to prolong ‘productive life’ in sheep?

• Genetic basis to longevity?

• How to define it, without relying on additional recording from farmers?
National data used

- Dorset n = 15.3K – 73.7K
- Texel n = 24.2K – 63.5K
- Lleyn n = 14K – 42.5K
- Different breeds and management systems

51 Dorset flocks
National data used

• Dorset n= 15.3K – 73.7K
• Texel n= 24.2K – 63.5K
• Lleyn n= 14K – 42.5K

• Different breeds and management systems

133 Texel flocks
National data used

- Dorset n= 15.3K – 73.7K
- Texel n= 24.2K – 63.5K
- Lleyn n= 14K – 42.5K

- Different breeds and management systems

160 Lleyn flocks
Traits

- Longevity
- Lambing interval 1-2
- Age @1\textsuperscript{st} lambing

- [Litter size born (reared) – already in breeding goal]
## % Heritability

<table>
<thead>
<tr>
<th></th>
<th>Lleyn</th>
<th>Dorset</th>
<th>Texel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longevity</td>
<td>7</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Lambing interval 1-2</td>
<td>12</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>% Heritability</td>
<td>Lleyn</td>
<td>Dorset</td>
<td>Texel</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Age @ 1\textsuperscript{st} lamb</td>
<td>31</td>
<td>31</td>
<td>16</td>
</tr>
</tbody>
</table>
Relationships between traits?

Correlations: Longevity and age @ 1\textsuperscript{st} lambing

<table>
<thead>
<tr>
<th></th>
<th>Dorset</th>
<th>Lleyn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic</td>
<td>0.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Phenotypic</td>
<td>0.7</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Implications?

Lambing ewe lambs leads to shorter lifespan
Relationships between traits?

Longevity and litter size

<table>
<thead>
<tr>
<th></th>
<th>Dorset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic</td>
<td>-0.4 (0.09)</td>
</tr>
<tr>
<td>Phenotypic</td>
<td>-0.2 (0.01)</td>
</tr>
</tbody>
</table>

Implications?

Higher litter size in Dorsets leads to shorter lifespan (Not the case for Lleyn)
## Relationships between traits?

**Longevity and lambing interval**

<table>
<thead>
<tr>
<th></th>
<th>Dorset</th>
<th>Lleyn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic</td>
<td>0.6 (0.08)</td>
<td>0.7 (0.07)</td>
</tr>
<tr>
<td>Phenotypic</td>
<td>0.6</td>
<td>0.65</td>
</tr>
</tbody>
</table>

**Implications?**

Less productive ewes last longer
Conclusions

Live fast – die young?

– ‘Biological’ constraints?
– But the correlations are not = 1!
– Possible to pick animals that are more productive AND live longer
Acknowledgements

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The Scottish Government

Signet
World wide lamb mortality

Pre-weaning mortality %

- UK:
- UK:
- Norway:
- France:
- New Zealand:
- New Zealand:
- Australia:
- Australia:
- USA:
- USA:
- Tobago:
- South Africa: