Development of Sheep systems in Finland and results from iSAGE

Marja-Liisa Sevón-Aimonen
Finnish breeds in iSAGE project

- Finnsheep is original breed and mostly used breed in production
  - belongs to the group of northern short tailed sheep breeds
  - one of the most prolific sheep breeds in the world
  - It is quite normal to have 3-4 lambs at one go and it’s fertile all around a year
Change of lambing month during last 35 years

Lambing, %

- April (huhtii): 40%
- March (maaliskuun): 30%
- January (tammi): 15%
- December (joulukuun): 5%
- Other months (heinä, elokuu, syys, lokakuun, marras, joulu): Less than 5%
• Texel is imported breed but it has been used in Finland already 60 years and is most common of imported meat breed
  • Moderate fertility, good muscularity
  • At the moment we have different lines of texel breeds (old danish lines, and new lines from UK and Holland)
Breeding value estimation of sheep in Finland

• The traits in breeding value estimation were
  • Weight at 120 days of age blup breeding values since 1992
  • Muscle depth, fat depth and body conformation at 120 days of age since 2002
  • Ewe productivity traits: born alive and litter weight gain from 3d to 42 days (describe unstrictly ewe milk production) from 2019

• All breeding values are calculated by MiX99
## Genetic parameters for meat production traits

### Finnsheep

<table>
<thead>
<tr>
<th>Trait</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Corrected weight at 120 d, kg</td>
<td>0.41 (0.01)</td>
<td>-0.14 (0.03)</td>
<td>-0.15 (0.03)</td>
<td>-0.27 (0.03)</td>
</tr>
<tr>
<td>2. Muscle depth, mm</td>
<td>-0.05</td>
<td>0.39 (0.00)</td>
<td>0.46 (0.03)</td>
<td>0.63 (0.02)</td>
</tr>
<tr>
<td>3. Fat depth, mm</td>
<td>-0.06</td>
<td>0.20</td>
<td>0.20 (0.00)</td>
<td>0.48 (0.03)</td>
</tr>
<tr>
<td>4. Body conformation</td>
<td>-0.07</td>
<td>0.42</td>
<td>0.19</td>
<td>0.26 (0.01)</td>
</tr>
</tbody>
</table>

### Texel

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Corrected weight at 120 d, kg</td>
<td>0.32 (0.02)</td>
<td>-0.03 (0.06)</td>
<td>0.04 (0.08)</td>
<td>-0.11 (0.07)</td>
</tr>
<tr>
<td>2. Muscle depth, mm</td>
<td>0.18</td>
<td>0.35 (0.02)</td>
<td>0.26 (0.07)</td>
<td>0.63 (0.04)</td>
</tr>
<tr>
<td>3. Fat depth, mm</td>
<td>0.06</td>
<td>0.17</td>
<td>0.14 (0.02)</td>
<td>0.22 (0.08)</td>
</tr>
<tr>
<td>4. Body conformation</td>
<td>0.17</td>
<td>0.46</td>
<td>0.15</td>
<td>0.23 (0.02)</td>
</tr>
</tbody>
</table>
## Genetic parameters of fertility traits

### Finnsheep

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<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Born alive at 1. parity</td>
<td>0.06 (0.01)</td>
<td>0.93 (0.04)</td>
<td>0.61 (0.08)</td>
<td>0.54 (0.09)</td>
</tr>
<tr>
<td>2. Litter weight gain at 1. parity</td>
<td>0.83</td>
<td>0.12 (0.02)</td>
<td>0.57 (0.08)</td>
<td>0.58 (0.08)</td>
</tr>
<tr>
<td>3. Born alive at later parities</td>
<td>-</td>
<td>-</td>
<td>0.06 (0.00)</td>
<td>0.93 (0.01)</td>
</tr>
<tr>
<td>4. Litter weight gain at later parities</td>
<td>-</td>
<td>-</td>
<td>0.80</td>
<td>0.07 (0.01)</td>
</tr>
</tbody>
</table>

### Texel

<table>
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<tr>
<th>Traits</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Born alive all parities</td>
<td>0.11 (0.01)</td>
<td>0.99 (0.00)</td>
</tr>
<tr>
<td>2. Litter weight gain at all parities</td>
<td>0.90</td>
<td>0.13 (0.01)</td>
</tr>
</tbody>
</table>
EBV for Age at 120 d of age

Number of records

EBV BLUP
EBV for muscle depth

EBV BLUP

Suomenlammass
Texel
Rygja
Oxford
Dorset
Ahvenanmaanlammass
Kainuunharmaa
Suffolk

Birth year

EBV BLUP

mm

Birth year


18 20 22 24 26 28 30 32 34
The index for ewe productivity for Finnsheep
• Only those born alive and the weight gain
• Of those fed by the mother herself are considered
• No extra benefit in productive index of litters over three lamb
Breeding index for ewe productivity

• Altought Finnsheep good fertility is one special feature of the breed, the extra large litters are not desirable
• Too big litters decrease birth weight, increase mortality during birth, if no supervised, the proportion of still birth or of those who died shortly after birth might increase up to 25 %.
• Extra work (helping in lambing, securing colostrum and milk supply, supplementary feeding if needed)

• The index for ewe productivity for Finnsheep
• only those born alive and the weight gain
• Of those fed by the mother herself are considered
• No extra benefit in productive index of litters over three lamb
The effect on total number of born to still born and need of artificial feeding

![Bar chart showing the number of lambs with different feeding statuses across different total numbers of born.](chart_image)
The effect of number of total born on number of alive lambs
Future plans

- Better relationship management
- now sire lines, avoiding inbreeding in breeding group planning
- In future EVA?
- New traits to breeding value estimation (wool, easy care, carcass weight and quality)
Importance of EBVs

• Heritability for weight and muscle depth at 120 d age are high (or moderate)
• It’s possible to get some genetic gain using phenotypic results, but using EBV are better prediction
• values corrected by animal age, mother age, litter size, farm-year effect – effects are included in statistical model
• Heritability for ewe productivity traits were low
• Trait is measurable only for female
• Genetic gain without EBVs is slow or impossible
• According to our case study often selection has made according to phenotypic results
Task 4.2 Innovation case study report

Analysis of farmers perception of the drivers and constrains for the uptake of a new selection index for ewe productivity

Luke and ProAgria

Finland
Summary of case study

• Selection is not always based on breeding values.
• In the case study we wanted to find reasons, which cause the differences in farmer’s willingness to use indices.
• We surveyed the importance of different factors to find possible bottlenecks in using the breeding indices.
• The preassumption was that difficulties in data transfer or use of information technology were the main reasons for avoiding the use of indices.

Important traits in selecting breeding ewes

- The growth index: 60%
- Meat production index: 60%
- Lamb production: 63%
- Else, what?: 44%

Selecting breeding animal from own flock

- Animal performance or measurement: 84%
- Performance or measurement of the dam of the animal: 61%
- The performance or measurement of the animal's sire: 44%
- Sibling performance or measurement results: 20%
- Own breeding index of animal: 56%
- Animal parent index if no animal index is available: 18%
- The father index of the animal, if no animal index is available: 20%
- Else, what?: 38%
It turned out that the lack of knowledge about the indices themselves and their benefits were the main factors.
Weather data: Average annual temperature and precipitation
Interaction between area and breed, weight at age of 120 days

Interaction between area and breed, blue=Finnsheep, red=Texel

Effect of temperature to weight at age of 120 d in Finnsheep (FS) and Texel (T)
Effect of temperature on litter weight gain in Finnsheep (FS) and Texel (T)
Weather changes, predictions

Temperature is going to increase more in winter, more in north
Kesä

Summer, precipitation
Sademäärä (mm)

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Climatic effect

- Based on the weather data, the current temperatures do not rise as high to affect the performance of the animals.
- To test the heat (or cold) resistance of the breeds, it should demand an experiment in which the temperature can be controlled.
  - Extreme weather events can affect production.
  - Drought reduces crop yields.
  - Rain hampers harvesting.
  - Warm winters can increase parasite retention in pastures.
  - Warming climate can increase diseases transmitted by insects.
Thank you!

Thanks to Silja Alamikkotervo, Pia Parikka, Milla Alanco-Ollqvist and John Dahlin for the pictures.