Highlights from the Leading Edge Project

Presenter:

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Host/Moderator: Jay Parsons

September 24, 2019

This webinar is made possible with funding support from the Let’s Grow Committee of the American Sheep Industry Association.
This evening’s talk

- Objectives of the project
- What we did and learned
  - Ram selection
  - Breeding
  - Lambing
  - Weaning
  - Finishing
  - Harvest
Grateful to sponsors
Objective

- Building on a foundation
  - In 2016 study, demonstrated a 3 lb. advantage in weaning weight in lambs sired by NSIP rams
Objective

- Extend on original study to:
  - Compare rams from distinctive categories (NSIP and industry)
  - Evaluate their progeny’s performance from birth to harvest
  - Incorporate DNA technologies
Ram selection (May to Oct. 2017)

- 42 Suffolk rams
  - 15 industry rams
  - 13 NSIP high post-weaning body weight rams
  - 14 NSIP high post-weaning muscle depth rams
NSIP rams’ expected progeny differences (EPD)

<table>
<thead>
<tr>
<th>Record</th>
<th>Ram category</th>
<th>Weight EPD (lb.)</th>
<th>Ultrasound EPD (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Weaning</td>
<td>Post-weaning</td>
</tr>
<tr>
<td><strong>At selection (Aug. 2017)</strong></td>
<td>Weight</td>
<td>5.4</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>Muscle</td>
<td>2.0</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>Difference</td>
<td>3.4</td>
<td>6.4</td>
</tr>
<tr>
<td><strong>Recently (July 2019)</strong></td>
<td>Weight</td>
<td>4.7</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>Muscle</td>
<td>1.5</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>Difference</td>
<td>3.2</td>
<td>6.2</td>
</tr>
</tbody>
</table>
Breeding (Nov. 2017)

- Mickel Brothers Sheep Co. (Spring City, UT)
- 1,100 commercial white-faced ewes
- 17 day breeding on regrowth alfalfa stubble
Lambing (April 2018)

- 1,491 lambs born from 879 ewes over a 3-week period
  - 1.69 lamb per ewe lambing
- Shed lambed
  - Allowed fostering
- Near birth
  - Weighed
  - Tagged (EID)

Sire?
Parentage (sire)

- A DNA sample was collected
  - on rams prior to breeding
Parentage (sire)

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  - on rams prior to breeding
  - on lambs near birth
Parentage (sire)

- Up to 163 genetic markers on DNA panel
- Assignments based on *exclusion* of sires
  - Key that full suite of potential sires are included

<table>
<thead>
<tr>
<th>Animal</th>
<th>Marker 1</th>
<th>Marker 2</th>
<th>Marker 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamb</td>
<td>AB</td>
<td>AA</td>
<td>BB</td>
</tr>
<tr>
<td>Sire 1</td>
<td>BB ✓</td>
<td>AA ✓</td>
<td>AB ✓</td>
</tr>
<tr>
<td>Sire 2</td>
<td>AA ✓</td>
<td>AB ✓</td>
<td>X</td>
</tr>
</tbody>
</table>

(Heaton et al. 2014)
Parentage (sire)

- Up to 163 genetic markers on DNA panel
- Assignments based on exclusion of sires
  - Key that full suite of potential sires are included
- Among 1,457 lambs with a DNA sample, 92% aligned with a sire
  - Nearly all losses were lab based (quality control; heterozygosity rate)

(Heaton et al. 2014)
Considerable variation in number of lambs sired by individual rams
Weaning (Sept. 2018)

- Grazed in mountains
  - Dry summer
- 1,104 lambs weighed in 4 hr.
  - Used Shearwell EID Weigh Crate
  - 1.26 lamb per ewe lambing
Weaning performance

**Weight**

- Industry
- Muscle
- Weight

**Daily gain**

- 0.03 lb/d
## Genetic differences in weaning weight

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight EPD (lb.) recently†</th>
<th>Progeny weaning weight (lb.)§</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weaning‡</td>
<td>Post-weaning‡</td>
</tr>
<tr>
<td>Weight</td>
<td>4.6</td>
<td>9.2</td>
</tr>
<tr>
<td>Muscle</td>
<td>1.9</td>
<td>4.2</td>
</tr>
<tr>
<td>Difference</td>
<td>2.6</td>
<td>5.0</td>
</tr>
</tbody>
</table>

† EPD from July 2019, weighted by the number of lambs with a wean weight from each ram.
‡ Weaning and post-weaning weights recorded at 45 to 90 and 90 to 150 days, respectively.
§ At, on average, 161 days of age.
Lamb birth and rearing type effects on weight weaned

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiv. wt. (lb.)</td>
<td>113.9</td>
<td>106.0</td>
<td>98.7</td>
</tr>
<tr>
<td>Litter wt. (lb.)</td>
<td>113.9</td>
<td>106.0</td>
<td>197.4</td>
</tr>
</tbody>
</table>

![Graph showing percent lamb crop by number of reared (None, One, Two)]
Finishing (Sept. 2018 to Apr. 2019)

- Shipped to Arthur Feed Lots for finishing (Burley, ID)
- Fed to a similar weight and target condition
  - Drafted in 6 batches
Finished weights

<table>
<thead>
<tr>
<th>Harvest date</th>
<th>Weight (lb.)</th>
<th>Days since planting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 6</td>
<td>138</td>
<td>(75 d)</td>
</tr>
<tr>
<td>Dec. 20</td>
<td>174</td>
<td>(89 d)</td>
</tr>
<tr>
<td>Jan. 4</td>
<td>182</td>
<td>(104 d)</td>
</tr>
<tr>
<td>Feb. 14</td>
<td>194</td>
<td>(145 d)</td>
</tr>
<tr>
<td>Mar. 19</td>
<td>173</td>
<td>(178 d)</td>
</tr>
<tr>
<td>Apr. 18</td>
<td>84</td>
<td>(208 d)</td>
</tr>
</tbody>
</table>
Spread of ram category by harvest date

<table>
<thead>
<tr>
<th>Harvest date</th>
<th>Industry</th>
<th>Muscle</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 6</td>
<td>15</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Dec. 20</td>
<td>20</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Jan. 4</td>
<td>25</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Feb. 14</td>
<td>30</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Mar. 19</td>
<td>20</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Apr. 18</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>
Harvest (Dec. 2018 to Apr. 2019)

- Lambs shipped to Superior Farms for slaughter (Dixon, CA)
- Comprehensive carcass evaluation
  - Electronic grading (VSS2000 System camera) of yield and quality grades
  - Carcass weights
  - Other carcass measurements
<table>
<thead>
<tr>
<th>Harvest Date</th>
<th>2018/12/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
<td>Lamb ABF</td>
</tr>
<tr>
<td>Program</td>
<td>ABF</td>
</tr>
<tr>
<td>Lot No</td>
<td>401</td>
</tr>
<tr>
<td>HotWeight</td>
<td>70.9</td>
</tr>
<tr>
<td>Yield Grade</td>
<td>2.490000</td>
</tr>
<tr>
<td>Quality Grade</td>
<td>Choice</td>
</tr>
<tr>
<td>Occ</td>
<td>46.90</td>
</tr>
<tr>
<td>Occ_Yield_0</td>
<td>66.78</td>
</tr>
<tr>
<td>Breast</td>
<td>8.7</td>
</tr>
<tr>
<td>Rack</td>
<td>8.4</td>
</tr>
<tr>
<td>Shoulder</td>
<td>17.5</td>
</tr>
<tr>
<td>Legs</td>
<td>23.6</td>
</tr>
<tr>
<td>Loins</td>
<td>7.4</td>
</tr>
<tr>
<td>Neck</td>
<td>1.7</td>
</tr>
<tr>
<td>Trotters</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Twin Born Ewe Lamb

**BW 14lbs**

**WW 110.23**

168 days of age at weaning

135.58 Live Wt.

70.9 Hot Weight

52.29 Dressing %

89 days on feed

0.285 ADG
Hot carcass weight and dressing percent

**Weight**

- **Industry**: 2.3 lb
- **Muscle**: 72 lb
- **Weight**: 74 lb

**Dressing percent**

- **Percent**: 51 - 53%
- **Ram category**: 1.3%
Hot carcass weight and dressing percent

Saleable meat‡

- Industry
- Muscle
- Weight

Fat thickness‡

- 0.012 in

‡ Electronic grading
Summing up

- Progeny of NSIP-sired rams performed as anticipated based on sires’ genetic merit
  - +4.5 lb. weaning weight in high weight
    - Worth +$6.39 to +$7.25/lamb (feeder price)
  - +1.1 lb. saleable meat yield in high muscle
- On average, progeny of industry rams performed intermediary to or less than muscle/weight NSIP rams
Summing up

- With DNA sample on sires and lambs, able to reliably assign parentage
- Tremendous opportunity to increase output by producing and rearing twin born lambs
- Variability in ram fertility troubling
Some further steps

- Complete carcass measures
  - Loin eye areas, fat depth and skin thickness
- Provide rams’ owners with details on their own animals
- Share results more widely
  - Webinar
  - Industry article(s) and pamphlet
  - Journal article(s)
Thank you!

- Project team
  - Tom Boyer
  - Rusty Burgett
  - Kim Chapman
  - Alan Culham
  - Lesa Eidman
  - Matt & Dan Mickel
  - Bill & Susan Shultz

Mickel Brothers Sheep Co.
Arthur Feed Lots
Thank you!

Questions?

Photos: Kyle Partain