Profitable Genetic Selection:
How the National Sheep Improvement Program Can Help the US Sheep and Goat Industry

Presenter:
Dr. Reid Redden
Extension Sheep Specialist and NSIP Chairman
North Dakota State University

Host/Moderator: Jay Parsons

December 17, 2013

This webinar is being offered in cooperation with the American Sheep Industry Association Rebuild the Sheep Inventory Committee.
For more information, go to www.sheepusa.org
National Sheep Improvement Program

“A Profit Driven Genetic Selection Tool”
National Sheep Improvement Program

“If you like your show sheep, you can keep your show sheep!”
National Sheep Improvement Program

- Additional Technology, not Substitution
- Improve Decisions, not Change
- Market Quantitative Data, not Qualitative
- Facilitate Collaboration (Apples to Apples)
- Initiate Profitable Measurements
Objectives for Goal 3 – Productivity Improvement

1. Promote widespread producer use of quantitative genetic selection
2. Reduce the seasonality of the lamb industry
3. Develop a long-term plan for U.S. sheep research and producer education
4. Develop industry-wide production metrics to measure productivity
NSIP Webinar Outline

- Past, Present, and Future of the Program
- Other Quantitative Genetic Programs
- Success Stories of the Program
- Nuts and Bolts
- Questions
Past, Present, Future

• Past
  – Non-profit formed by the Sheep Industry in 1980s
  – Developed EPDs
  – Transitioned to Sheep Genetics (LambPlan)
    • EBVs = EPD x 2
    • Software
    • Reports Twice a Month
Past, Present, Future

• Present
  – NSIP Office
    • Mary Sorenson
  – Board of Directors
    • Chairman – Reid Redden
    • Vice Chairman – Cody Hiemke
    • Secretary – Mary Langhus
    • Treasurer – Jack McRae
    • Technical – Dave Notter
    • Advisor – Rodney Kott
Past, Present, Future

• Present
  – Board of Directors
    • Polypay – John Carlson
    • Suffolk/Dorset – Alan Culham
    • Katahdin – Carl Ginapp
    • Hampshire – Dan Morrical
    • Tracie Roeder – Targhee
    • Dan Waldron – Rambouillet
    • Jim Morgan – At Large
Past, Present, Future

• Present
  – 20 Breeds
  – 150 Flocks
  – 10,000 sheep
  – Currently, the lack of acceptance of this technology has put our industry at a competitive disadvantage to foreign competition and other sources of food and fiber
Past, Present, Future

• Future
  – 50% or greater seedstock sheep breeders
  – 50% or greater commercial buyers using EBVs
  – Active group of meat goat breeders
Beef Cattle

• Ground work for EPD were done in the 1970s

• Commercial acceptance of growth data started in the 1980s
U.S. dairy herd and milk production per cow

Output per cow (right axis)

Million cows

1,000 pounds per cow

US Consumption and Supply of Lamb

We need to produce more lamb with less ewes!

NSIP can help the industry accomplish this goal!

Source: USDA, Economic Research Service
NSIP Success Stories

Genetic Trend for EBVs for Kilograms of Lamb Weaned per Ewe Lambing in Polypay Sheep

Kg of lamb weaned per ewe lambing
NSIP Success Stories

Genetic Trend for Weaning and 120-day Post-weaning Weight EBVs (kg) in Suffolk Sheep

- Weaning wt
- Postweaning wt
NSIP Success Stories

Genetic Trend for Backfat Depth and Loin Muscle Depth (mm) in Suffolk Sheep

- Fat depth
- Loin muscle depth

NSIP Success Stories

Katahdin Reproduction

- NLB
- NLW
NSIP Success Stories

Targhee Reproduction, Growth, and Wool
Lamb crop is defined as lambs born in the Eastern States and lambs docked or branded in the Western States.
How EPD’s are used?

In the current lamb market, that equates to $10 per lamb. If he sires 50 lambs for 4 years, Ram #2 generate approximately $2,000 more than Ram #1 in his first generation offspring.
How the Program Works

• Seedstock Breeders Enroll
  – $50 to 350 annual fee based on flock size
    • Waive enrollment fee first year
    • Waive enrollment fee for 3 years for youth (22)
  – Collect data relevant to flock and breed
  – Enter data into software program
  – Submit data to LambPlan (Sheep Genetics)
    • $2.65 per animal (90 days)
  – Produce Estimate Breeding Values
  – Use EBVs for Marketing and Selection
How the Program Works

• Commercial/Seedstock Producers
  – Purchase sheep with EBVs

• Montana Ram Sale
  – Rams with EBV Data - $
  – Rams without EBV Data - $

How the Program Works

• Estimated Breeding Values (EBVs)
  – Growth Traits
    • Birth Weight (kg, 24 hours)
    • Weaning Weight (kg, 45 to 90 days)
    • Maternal Weaning Weight (kg, Milk)
    • Post Weaning Weight (kg, 91 to 305 days)
    • Yearling Weight (kg, 290 to 430 days)
How the Program Works

• Estimated Breeding Values (EBVs)
  – Reproduction Traits
    • Number of Lamb Born (%)
    • Number of Lambs Weaned (%)
  – Carcass Traits
    • Loin-Eye Muscle Depth (mm, PWWT)
    • Fat Depth (mm, PWWT)
  – Parasite Resistance
    • Worm Egg Count (%, WWT or PWWT)
How the Program Works

• Estimated Breeding Values (EBVs)
  – Wool Traits
    • Fleece Weight (%, yearling)
    • Fiber Diameter (um, yearling)
    • Staple Length (mm, yearling)
  – Indexes
    • Carcass Plus (+PWWT, +EMD, -FAT)
    • US Hair (+WWT, +MWWT, +NLW, -NLB)
    • US Maternal (+WWT, +MWWT, +NLW, -NLB)
    • US Range (+PWWT, + MWWT, - YWT, +FW, -FD, +NLB)
How the Program Works

• Lamb Weaning Weight
  – Adjustments
    • Age/BW
    • Birth/Rearing Type
    • Age of Dam
    • Sex
  – Difference from Mean
    • Farm
    • Lambing Season (35 d)
    • Report all data
How the Program Works

- Progeny Testing
  - Animal is the average of Sire and Dam
  - Sire and Dam EBVs are adjusted based on lamb performance compared to other sires and dams in the contemporary group
# How the Program Works

## Sire Report - Hampshire

<table>
<thead>
<tr>
<th>ID</th>
<th>Flock</th>
<th>Prg Flks</th>
<th>Bwt kg</th>
<th>WWt kg</th>
<th>MWt kg</th>
<th>PWWt kg</th>
<th>PFat mm</th>
<th>PERT kg</th>
<th>PERTM mm</th>
<th>NLB %</th>
<th>NLW %</th>
<th>PSC cm</th>
<th>Lamb 2020</th>
<th>Carc+ Sire Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td>693003-2012-012013</td>
<td>University Wisconsin</td>
<td>10 : 1</td>
<td>0.54</td>
<td>2.67</td>
<td>-0.27</td>
<td>3.48</td>
<td>-3.14</td>
<td>1.39</td>
<td>-5.40</td>
<td>-5.3</td>
<td>-0.8</td>
<td>106.2</td>
<td>147.0</td>
<td>6930032011101631</td>
</tr>
<tr>
<td>693011-2011-11101</td>
<td>NDSU</td>
<td>25 : 1</td>
<td>0.14</td>
<td>3.11</td>
<td>0.27</td>
<td>7.50</td>
<td>-1.90</td>
<td>-0.42</td>
<td>-0.50</td>
<td>-1.2</td>
<td>0.0</td>
<td>104.9</td>
<td>136.4</td>
<td>6930112006SC1036</td>
</tr>
<tr>
<td>693005-2007-BLT777</td>
<td>IA STATE UNIV</td>
<td>66 : 1</td>
<td>0.39</td>
<td>1.39</td>
<td>-0.26</td>
<td>2.29</td>
<td>-2.61</td>
<td>0.73</td>
<td>10.0</td>
<td>-6.4</td>
<td>0.0</td>
<td>104.0</td>
<td>130.2</td>
<td>693011200668559</td>
</tr>
<tr>
<td>693004-2012-1215F2</td>
<td>Richard and Mark Roebecke</td>
<td>9 : 1</td>
<td>0.14</td>
<td>1.25</td>
<td>-0.17</td>
<td>2.11</td>
<td>-1.76</td>
<td>1.11</td>
<td>-1.50</td>
<td>-0.4</td>
<td>0.0</td>
<td>104.1</td>
<td>130.2</td>
<td>693004201111115M2</td>
</tr>
<tr>
<td>693003-2011-011031</td>
<td>University Wisconsin</td>
<td>64 : 1</td>
<td>-0.20</td>
<td>0.20</td>
<td>-0.08</td>
<td>-0.71</td>
<td>-0.59</td>
<td>2.42</td>
<td>0.75</td>
<td>20.0</td>
<td>34.0</td>
<td>103.8</td>
<td>128.0</td>
<td>6930032011010075</td>
</tr>
<tr>
<td>693003-2010-010120</td>
<td>University Wisconsin</td>
<td>31 : 2</td>
<td>0.71</td>
<td>1.91</td>
<td>-0.86</td>
<td>2.92</td>
<td>-3.10</td>
<td>-0.02</td>
<td>-8.10</td>
<td>-0.1</td>
<td>0.0</td>
<td>103.5</td>
<td>127.0</td>
<td>6930032005DF1263</td>
</tr>
<tr>
<td>693003-2008-059004</td>
<td>University Wisconsin</td>
<td>65 : 1</td>
<td>0.15</td>
<td>0.55</td>
<td>-0.24</td>
<td>1.23</td>
<td>-1.61</td>
<td>1.10</td>
<td>-3.80</td>
<td>-0.9</td>
<td>0.0</td>
<td>103.4</td>
<td>125.6</td>
<td>693003200707109S</td>
</tr>
<tr>
<td>693011-2006-SC1036</td>
<td>NDSU</td>
<td>67 : 1</td>
<td>-0.28</td>
<td>1.69</td>
<td>0.06</td>
<td>6.24</td>
<td>-0.56</td>
<td>-0.34</td>
<td>-0.50</td>
<td>-0.8</td>
<td>0.0</td>
<td>103.4</td>
<td>124.7</td>
<td>693003200505566</td>
</tr>
<tr>
<td>693003-2010-010075</td>
<td>University Wisconsin</td>
<td>31 : 1</td>
<td>0.10</td>
<td>1.37</td>
<td>-0.34</td>
<td>1.99</td>
<td>-0.88</td>
<td>0.74</td>
<td>-1.90</td>
<td>-0.3</td>
<td>-0.7</td>
<td>103.0</td>
<td>122.2</td>
<td>69300320091550</td>
</tr>
<tr>
<td>693003-2007-07109S</td>
<td>University Wisconsin</td>
<td>27 : 2</td>
<td>0.42</td>
<td>0.57</td>
<td>-0.65</td>
<td>-0.50</td>
<td>-2.00</td>
<td>0.99</td>
<td>-8.40</td>
<td>-0.8</td>
<td>0.0</td>
<td>102.5</td>
<td>119.0</td>
<td>6930032005DF1283</td>
</tr>
<tr>
<td>693003-2008-08146S</td>
<td>University Wisconsin</td>
<td>73 : 2</td>
<td>0.56</td>
<td>2.69</td>
<td>0.19</td>
<td>5.05</td>
<td>-1.86</td>
<td>-1.10</td>
<td>5.40</td>
<td>-4.8</td>
<td>0.2</td>
<td>102.5</td>
<td>119.0</td>
<td>6930052007071014</td>
</tr>
<tr>
<td>693003-2010-010006</td>
<td>University Wisconsin</td>
<td>17 : 1</td>
<td>1.03</td>
<td>4.39</td>
<td>-0.06</td>
<td>7.62</td>
<td>-2.48</td>
<td>-2.48</td>
<td>5.80</td>
<td>2.7</td>
<td>1.1</td>
<td>102.3</td>
<td>118.7</td>
<td>6930052007071014</td>
</tr>
<tr>
<td>693004-2007-Z735TW</td>
<td>Richard and Mark Roebecke</td>
<td>55 : 1</td>
<td>-0.19</td>
<td>0.52</td>
<td>-0.09</td>
<td>1.34</td>
<td>-0.33</td>
<td>1.00</td>
<td>-2.10</td>
<td>0.4</td>
<td>-0.4</td>
<td>102.6</td>
<td>118.6</td>
<td>693004200500122</td>
</tr>
<tr>
<td>693004-2010-2C1019</td>
<td>Richard and Mark Roebecke</td>
<td>36 : 1</td>
<td>0.08</td>
<td>1.71</td>
<td>0.86</td>
<td>3.34</td>
<td>-0.65</td>
<td>0.03</td>
<td>-1.70</td>
<td>-4.7</td>
<td>0.2</td>
<td>102.5</td>
<td>118.6</td>
<td>69300420090W839S</td>
</tr>
<tr>
<td>693004-2011-1115M2</td>
<td>Richard and Mark Roebecke</td>
<td>23 : 1</td>
<td>0.04</td>
<td>1.05</td>
<td>0.10</td>
<td>1.20</td>
<td>-0.42</td>
<td>0.78</td>
<td>-3.50</td>
<td>-6.0</td>
<td>-0.9</td>
<td>102.3</td>
<td>117.3</td>
<td>69300420077735TW</td>
</tr>
<tr>
<td>693004-2008-0W839S</td>
<td>Richard and Mark Roebecke</td>
<td>43 : 1</td>
<td>0.37</td>
<td>1.49</td>
<td>0.57</td>
<td>0.98</td>
<td>-1.02</td>
<td>0.50</td>
<td>-9.90</td>
<td>-14.0</td>
<td>-0.3</td>
<td>102.2</td>
<td>116.8</td>
<td>69300420066636PTW</td>
</tr>
</tbody>
</table>
Conclusion

• It Works! Use it!
• Enrollment forms are available on the website:
  www.nsip.org
ASI Convention

• Genetic Stakeholders Meeting @ 1 pm (1/23/14)
  – Enhancement of NSIP, Why it is not the 1980’s version, Reid Redden
  – How to stretch the impact of your genetics: a Cooperative Breeding Group that actually works, Kreg Leymaster
  – How to breed or select terminal sires to improve your lambs when marketed in a value based system. David Notter

• NSIP Board Meeting @ 3 pm (1/23/14)
  – NSIP Business, Open Meeting
  – Election of Officers/Directors

• Register at www.sheepusa.org
Profitable Genetic Selection:
How the National Sheep Improvement Program Can Help the US Sheep and Goat Industry

Presenter:
Dr. Reid Redden
Extension Sheep Specialist and NSIP Chairman
North Dakota State University

Host/Moderator: Jay Parsons

December 17, 2013

This webinar is being offered in cooperation with the American Sheep Industry Association Rebuild the Sheep Inventory Committee.