Status of evaluation of three maternal lines under pasture lambing experiment at USMARC

Easy Care

Katahdin

Polypay

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USDA is an equal opportunity provider and employer.
Reducing labor per ewe is one of the best opportunities to increase profitability and attract new investments to the industry.

One approach is to use “easy care” genetics in a low-input, pasture-lambing production system.

Romanov provided the genetic foundation for ewes.

Identified breeds that complement Romanov germplasm.

The strategy was to create well-balanced levels of prolificacy and maternal ability in Romanov crossbred ewes to realize acceptable lamb survival.
Desirable Ewes for Pasture Lambing

✓ eliminate shearing
✓ avoid docking tails
✓ have no horns to remove
✓ are genetically resistant to scrapie and OPP
✓ are genetically resistant to parasites
✓ have long breeding seasons
✓ raise twins and triplets on pasture unaided
✓ balance mothering ability and prolificacy
✓ transmit lamb behavior enhancing survival
✓ have a long productive life
Develop an easy-care maternal line of prolific hair sheep that can raise triplets on pasture without labor or supplemental feed.

1/2 Romanov  
1/4 Katahdin  
1/4 White Dorper
Management Procedures during experiment

✓ 35 d mating season (multi-sire) during Dec. Ewes assigned to PB or Terminal mating system for entire experiment

✓ Lamb in groups of 100 ewes on 10 acre pastures in May

✓ As little intervention as possible during lambing period (cases of hypothermia are intervened)

✓ Tag lambs, castrate males and get blood sample after lambing season over. Wean at ~ 70 d

✓ Genotype for parentage and line determination
### Evaluation of ewe productivity through 4 parities

#### Year of evaluation

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<td>2013</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>x</td>
<td>x</td>
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</table>

**Additional Evaluations on these lines:**

- Carcass trait data on 2016 and 2017 lambs
- Parity 5 lambing data in barns under cameras
  Starts March 2018.
Number of ewes exposed per breed and mating system

<table>
<thead>
<tr>
<th>Ewe Breed</th>
<th>Purebred</th>
<th>Terminal - Texel</th>
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<tbody>
<tr>
<td>Year</td>
<td>’14</td>
<td>’15</td>
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<tr>
<td>Katahdin</td>
<td>65</td>
<td>122</td>
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<tr>
<td>Polypay</td>
<td>72</td>
<td>139</td>
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<tr>
<td>Easycare</td>
<td>70</td>
<td>134</td>
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∑ = 3136
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<thead>
<tr>
<th>EWE TRAITS</th>
<th>LAMB TRAITS</th>
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<tbody>
<tr>
<td>Lambing Band</td>
<td>Lambing Band</td>
</tr>
<tr>
<td>Maternal Line</td>
<td>Sex</td>
</tr>
<tr>
<td>Mating System</td>
<td>Maternal Line</td>
</tr>
<tr>
<td>Age of Dam</td>
<td>Mating System</td>
</tr>
<tr>
<td>2-way interactions</td>
<td>Age of Dam</td>
</tr>
<tr>
<td>Sire of ewe (line)</td>
<td>Wean Family Size</td>
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<tr>
<td></td>
<td>2-way interactions</td>
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<td></td>
<td>Sire of lamb (line)</td>
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Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

<table>
<thead>
<tr>
<th>Maternal line</th>
<th>Mating System</th>
<th>Ewes Exposed</th>
<th>Lambs born (found ?) per ewe exposed</th>
<th>Lambs weaned per ewe exposed</th>
<th>Lamb wean wt per ewe exposed, kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katahdin</td>
<td>PB</td>
<td>488</td>
<td>1.27</td>
<td>1.13</td>
<td>17.73</td>
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<tr>
<td></td>
<td>TX</td>
<td>474</td>
<td>1.24</td>
<td>1.07</td>
<td>18.04</td>
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<tr>
<td>Polypay</td>
<td>PB</td>
<td>534</td>
<td>1.36</td>
<td>1.12</td>
<td>18.73</td>
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<tr>
<td></td>
<td>TX</td>
<td>549</td>
<td>1.33</td>
<td>1.13</td>
<td>20.26</td>
</tr>
<tr>
<td>Easycare</td>
<td>PB</td>
<td>557</td>
<td>1.77</td>
<td>1.57</td>
<td>22.26</td>
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<tr>
<td></td>
<td>TX</td>
<td>534</td>
<td>1.74</td>
<td>1.50</td>
<td>22.22</td>
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</table>

\[ P = 0.99 \quad P = 0.22 \quad P = 0.17 \]
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Conception rates

Maternal line by mating system

KT x KT    KT x TX    PO x PO    PO x TX    EZ x EZ    EZ x TX

P = 0.86
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Conception rates

Maternal line

P < 0.001
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Conception rates

Age of Dam

P < 0.001
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Number lambs born and weaned / ewe exposed

Maternal line by mating system

KT x KT  KT x TX  PO x PO  PO x TX  EZ x EZ  EZ x TX

P > 0.26
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Number lambs born and weaned / ewe exposed

Maternal line

KT
PO
EZ

P < 0.001
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Number lambs born and weaned / ewe exposed

Age of dam

P < 0.001
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Lamb wean wt and 20 wk wean wt / ewe exposed, kg

Maternal line

KT
PO
EZ

P < 0.001
Productivity of Katahdin, Polypay, and Easycare ewes in production system experiment in 2014-2017

Lamb wean wt and 20 wk wt / ewe exposed, kg

Age of dam

P < 0.001
Direct effects on lamb growth
In production system experiment in 2014-2017

Lamb wean wt and 20 wk wt, kg

Maternal line by mating system

KT x KT  KT x TX  PO x PO  PO x TX  EZ x EZ  EZ x TX

P = 0.12
P < 0.001
Direct effects on lamb growth
In production system experiment in 2014-2017

Lamb wean wt, kg

Maternal line

- KT
- PO
- EZ

13
13.5
14
14.5
15
15.5
16
16.5

P < 0.001
Direct effects on lamb growth
In production system experiment in 2014-2017

Lamb wean wt, kg

Mating System

PB
TX

P < 0.001
Direct effects on lamb growth
In production system experiment in 2014-2017

P < 0.001
Direct effects on lamb growth
In production system experiment in 2014-2017

Lamb wean wt, kg

SINGLE  TWIN  TRIPLET

WEAN FAMILY SIZE

P < 0.001
### FREQ of triplet lambs in production system experiment in 2014-2017

<table>
<thead>
<tr>
<th>Maternal line</th>
<th>Mating System</th>
<th>Triplet sets born</th>
<th>Triplet sets weaned</th>
<th>Triplet sets weaned</th>
<th>Triplet sets weaned</th>
<th>Triplet sets weaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katahdin</td>
<td>PB</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<td></td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Polypay</td>
<td>PB</td>
<td>6</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>0</td>
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<tr>
<td></td>
<td>TX</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Easycare</td>
<td>PB</td>
<td>37</td>
<td>17</td>
<td>16</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>TX</td>
<td>32</td>
<td>11</td>
<td>15</td>
<td>5</td>
<td>1</td>
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</table>
211 sets of triplets were born to 2- and 3-year-old Romanov crossbred ewes.

3% of ewes raised 0 lambs.
10% of ewes raised 1 lamb.
40% of ewes raised 2 lambs.
47% of ewes raised 3 lambs.
3% of ewes raised 0 lambs. 
11% of ewes raised 1 lamb. 
45% of ewes raised 2 lambs. 
41% of ewes raised 3 lambs.

69 sets of triplets were born to EZ ewes
Summary

- Utilizing appropriate genetics resources for increased reproduction under low input management systems is attainable, letting these ewes rear triplets!

- Utilizing both maternal and individual lamb heterosis is the most important aspect of increasing reproductive performance.

- Further evaluation of lamb growth carcass merit along with maternal/lamb behavior in parity 5 and ewe longevity data to complete experiment.

- Plans for selection experiment within EZ population for tolerance to parasites.