Modern Sheep Production in Virginia

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% CHANGE ALL SHEEP & LAMBS
JANUARY 1, 1996 TO JANUARY 1, 2005

-7 to 61  (8)
-16 to -7  (5)
-22 to -16  (7)
-32 to -22  (4)
-54 to -32  (9)

New England States
Livestock Marketing Information Center
Data Source: USDA/NASS

Other States
105.5
U.S. Total
-27.5

-37.5
-27.2
-31.8
-33.8
-1.1
-12.7 -12.3
-18.3
-34.4
-7.6 -24.7
-54.0
15.4
-16.0
-7.2
-17.6
-36.3
-4.6
-21.6
-18.8
-34.4
60.0
MD -8.0
33.3
58.6

Challenges to Sheep Production in Virginia

- Parasites
- Predators
- Wool
- Marketing
- Management and labor requirements

Modern Sheep Producers

- Influx of new producers
- Diverse interests, motivations
- Well-educated
- Limited agricultural/husbandry experience
- Hungry for information

SLAUGHTER LAMB PRICES
3-Market Average, Weekly

$ Per Cwt.

- 1999-03
- 2004
- 2005

Avg. 1999-03
2004
2005
Sheep Internal Parasites

- Most important is barber pole worm, *Haemonchus contortus*
  - Blood sucking parasite
    - Anemia (pale) and bottle jaw
  - Other, similar parasites contribute but not usually a problem by themselves

Parasite Control Challenges

- Climate
  - Long, warm, humid summers perfect for life cycle of *Haemonchus*
    - 300 worms → 1.5 million eggs/day
  - All the common worms have the same life cycle
  - Sheep infected when ingest larvae on pasture

- Management
  - Stocking density, small paddocks

- Drug Resistance

Dewormers

- 3 major categories
  - Tramisol, Levasole
  - Valbazen
  - Ivomec drench, Cydectin drench

- Resistant barber pole worm can be found for all drug groups

Drug Resistance

- Defined
  - Genetic ability of worm to withstand the effects of a drug

- Causes
  - A few worms have the genetic ability to resist a drug before you use it
    - Use of a drug gives those worms an advantage
    - Gradually the number of resistant worms increases

- Contributing Factors
  - Frequent treatments
  - Mass treatments, indiscriminate treatments
  - Sheep do not get full drug dose
    - Under-dosing
    - Improper administration

Methods to Slow Resistance

- Use dewormers correctly
  - Dosage
  - Annual rotation

- Don’t bring in resistance
  - Deworm new sheep with drugs from 2 major groups and quarantine

- Practice strategic parasite control measures:
  - Rotational grazing
  - Resting pastures (3 or more months)
  - Alternation of sheep with cattle or horses (and co-species grazing)

- Reduce Number of Deworming Treatments

Reducing Deworming

“Selective deworming” - deworm only wormiest animals
  - i.e. FAMACHA system

- Others
  - Good nutrition
  - Put most susceptible animals on safest pasture (lambs vs. ewes)
  - Reduce stocking density
  - Mixed or alternate grazing
  - Genetics
  - Cull highly susceptible animals
**Principles of Selective Deworming**
- Opposite of previous recommendations (deworm all animals at the same time)
- 20-30% of sheep have most of worms, and deposit 80% of total eggs
- Not all worms exposed to drug treatment, slows development of resistance
  - Susceptible worms in untreated animals reproduce
  - Helps dilute out resistant worms

**The FAMACHA© System**
- Eye color chart with five color categories
- Compare chart with color of mucous membranes of sheep or goat
- Classification into one of five color categories:
  - 1 - not anemic
  - 5 - severely anemic

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**Using FAMACHA ©**
- General criteria for deworming
  - If in doubt, score at paler category
  - Score 1 or 2-- don’t deworm
  - Score 4 or 5--deworm
  - Score 3-?
    - If lambs--deworm
    - Adults--it depends
      - Lactating or stressed or high parasite challenge-- consider deworming
      - Consider deworming if want maximum effect on egg production

**FAMACHA© SYSTEM**
- **WHAT IT WILL DO**
  - Slow accumulation of resistant worms
  - Save expense on dewormers
  - Allow you to identify and cull susceptible sheep, retain highly resistant sheep
  - General management tool
- **WHAT IT WON’T DO**
  - Be the answer to parasite problems by itself
  - Eliminate drug resistant worms
- **CHALLENGES**
  - Labor intensive
  - Not silver bullet

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**Precautions**
- Only properly trained persons should apply the FAMACHA© system
  - In U.S. must attend a workshop with hands on exposure to sheep with different eye colors to get card
- The card is an AID in the control of Haemonchus only
- Only part of a parasite control program, remember other management strategies

**Hair sheep**
- Hair sheep genetic resources
  - Caribbean origin: Barbados Blackbelly, St. Croix
  - South Africa: Dorper
  - U.S.: Katahdin
Virginia Tech
Hair Sheep Research:
Project Summary

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Virginia Polytechnic Institute and State University
Blacksburg, VA

Glade Spring
Project Objectives

- Evaluation of hair sheep composite breeds in easy-care production system
  - Lamb growth and survival
  - Parasite resistance
  - Carcass composition and product sensory attributes
  - Maternal performance

Experimental Design—Phase I
Crossbred Lamb Production 1999-2002

- Produce ~50 Dorset and ~50 Dorper crosses/year for 3 years
- Purchase 20 Katahdin ewe lambs/year from 10 to 15 flocks
- Purchase Katahdin and Hair cross (St. Croix x BB) wethers
- Evaluate lamb growth, carcass traits, parasite resistance, palatability

Growth of Dorset and Dorper-sired lambs

<table>
<thead>
<tr>
<th>Item</th>
<th>Year</th>
<th>Dorset</th>
<th>Dorper</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. born</td>
<td>All</td>
<td>262</td>
<td>181</td>
</tr>
<tr>
<td>Birth weight, lb.</td>
<td>All</td>
<td>8.27</td>
<td>7.87†</td>
</tr>
<tr>
<td>Weaning wt., lb.</td>
<td>2000</td>
<td>43.0</td>
<td>47.8*</td>
</tr>
<tr>
<td></td>
<td>2001</td>
<td>43.2</td>
<td>42.8</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>35.3</td>
<td>31.5</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>40.6</td>
<td>40.6</td>
</tr>
<tr>
<td>Summer gain, lb/d</td>
<td>All</td>
<td>0.41</td>
<td>0.41</td>
</tr>
<tr>
<td>Drylot gain, lb/d</td>
<td>All</td>
<td>0.33</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Parasite Resistance

Ewe lambs – Fecal Egg Counts

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEC, eggs/gram</td>
<td>FEC, eggs/gram</td>
<td>FEC, eggs/gram</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>4500</td>
<td>4000</td>
<td>3500</td>
</tr>
<tr>
<td>2001</td>
<td>3000</td>
<td>2500</td>
<td>2000</td>
</tr>
<tr>
<td>2002</td>
<td>1500</td>
<td>1000</td>
<td>500</td>
</tr>
</tbody>
</table>
Ewe lambs – Packed Cell Volume

- PCV, %
- Dorset X, Dorper X, Katahdin

Wethers: Fecal Egg Counts

- Year: 2001, 2002
- FEC, eggs/gram
- Dorset X, Dorper X, Katahdin, Hair X

Carcass Composition

- Trait: Live Wt., Carcass Wt., Dress %
- Trait (Age Constant Endpoint)
- Trait (Adjusted to Constant Wt.)
- Dorset = 100
- Breed means with different superscripts differ ($P < 0.05$).

Lamb tenderness and flavor

- Trait: Fat th., KP %, REA, Leg Score, Retail Cut %
- Breed means with different superscripts differ ($P < 0.05$).
Shear force of longissimus muscle by breed type

<table>
<thead>
<tr>
<th>Breed type</th>
<th>Shear force, kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorper X</td>
<td>2.7</td>
</tr>
<tr>
<td>Non-Dorper X</td>
<td>2.1</td>
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</tbody>
</table>

Breed types differ (P<0.01)

Sensory panel tenderness ratings by breed type

<table>
<thead>
<tr>
<th>Trait</th>
<th>Dorset crossbred</th>
<th>Dorper crossbred</th>
<th>Katahdin</th>
<th>Hair crossbred</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial tenderness</td>
<td>5.29</td>
<td>5.17</td>
<td>5.56</td>
<td>5.30</td>
<td>0.19</td>
</tr>
<tr>
<td>Overall tenderness</td>
<td>5.21</td>
<td>5.22</td>
<td>5.61</td>
<td>5.32</td>
<td>0.20</td>
</tr>
<tr>
<td>Juciness</td>
<td>4.93</td>
<td>4.95</td>
<td>4.96</td>
<td>5.11</td>
<td>0.15</td>
</tr>
<tr>
<td>Lamb flavor</td>
<td>4.40</td>
<td>4.29</td>
<td>4.48</td>
<td>4.35</td>
<td>0.11</td>
</tr>
<tr>
<td>Off-flavor</td>
<td>0.09</td>
<td>0.07</td>
<td>0.10</td>
<td>0.13</td>
<td>0.04</td>
</tr>
</tbody>
</table>

1 Tenderness scale: 1 = extremely tough to 8 = extremely tender. Juciness and lamb flavor scale: 1 = extremely dry or bland to 8 = extremely juicy or intense. Off-flavor scale: 0 = none to 8 = extremely intense.

Experimental Design—Phase II
Crossbred Ewe Evaluation 2000-2005

- Establish flocks of ~50 each of Dorset crosses, Dorper crosses, and Katahdins
- Mate to Suffolk rams for 3 years
- Evaluate ewe size, reproduction, parasite resistance, and coat characteristics.
- Evaluate lamb growth, carcass traits, and parasite resistance, palatability

Numbers of lambs born to Dorset crossbreed, Dorper crossbreed, and Katahdin ewes of different ages

Numbers of lambs weaned per ewe lambing for Dorset crossbred, Dorper crossbred, and Katahdin ewes

Average 60-day lamb weaning wt for lambs from Dorset crossbred, Dorper crossbred, and Katahdin ewes

DO-X and DP-X ewes are both 1/8 Finnsheep; KT ewes are purebred Katahdin
Fecal egg counts for adult Dorset crossbred, Dorper crossbred, and Katahdin ewes

Year

Log fecal egg count

2004 2005 Average

DO-X DP-X KT

Fecal egg counts for lambs out of Dorset crossbred, Dorper crossbred, and Katahdin ewes

Year

Log fecal egg count

2004 2005 Average

DO-X DP-X KT

Where do they fit??

- Extensive production systems
- Maternal performance
  - Productivity, parasite resistance
- Katahdin
  - Maternal
  - Moderate parasite resistance
  - Growth/carcass intermediate to wool and Caribbean hair
- Dorper
  - Terminal or cross with other hair breeds
  - Little parasite resistance
  - Growth/carcass more similar to wool breeds
- Caribbean breeds (St. Croix, Blackbelly)
  - Maternal- cross with other breeds
  - Most parasite resistant
  - Unimproved breeds

Challenges to Sheep Production in Virginia

- Parasites
- Predators
- Wool
  - Finding shearers
- Wool prices
- Marketing
- Management and labor requirements

Lamb Marketing Options

- Livestock auctions
- Special sales
- Cooperative marketing entities
- Direct marketing

ALL DRIVEN BY THE ETHNIC MARKET

Defining the Ethnic Lamb

- Wide range in acceptable weights
- Adequate finish- not extremely fat or thin
- Generally prefer males
- Less discriminate
  - “old crop”
  - tails, horns
  - hair sheep
Successful Marketing

- Product offering must be compatible with marketplace
- Match marketing scheme
  - Genetics
  - Production System
    - lambing date
    - nutrition/feeding program

Marketing Considerations

- Management
  - Parasites
  - Predators
- Current value vs. future value
  - Cost of gain (feed/forage, death loss, performance)
  - Predicting future market
- Local market vs. PA vs. direct marketing

Ethnic Holiday Calendar

<table>
<thead>
<tr>
<th>Holiday</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
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<tbody>
<tr>
<td>Christmas</td>
<td>December 25</td>
<td>January 1</td>
<td>December 25</td>
<td>January 1</td>
<td>December 25</td>
<td>January 1</td>
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<tr>
<td>New Year</td>
<td>January 1</td>
<td>January 1</td>
<td>January 1</td>
<td>January 1</td>
<td>January 1</td>
<td>January 1</td>
</tr>
<tr>
<td>Martin Luther King Day</td>
<td>January 15</td>
<td>January 16</td>
<td>January 15</td>
<td>January 16</td>
<td>January 15</td>
<td>January 16</td>
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<tr>
<td>Easter</td>
<td>March 21</td>
<td>March 22</td>
<td>March 21</td>
<td>March 22</td>
<td>March 21</td>
<td>March 22</td>
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<tr>
<td>Cinco de Mayo</td>
<td>May 5</td>
<td>May 6</td>
<td>May 5</td>
<td>May 6</td>
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<td>May 6</td>
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<tr>
<td>Independence Day</td>
<td>July 4</td>
<td>July 5</td>
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<td>July 5</td>
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<tr>
<td>Labor Day</td>
<td>May 28</td>
<td>May 29</td>
<td>May 28</td>
<td>May 29</td>
<td>May 28</td>
<td>May 29</td>
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<tr>
<td>Halloween</td>
<td>October 31</td>
<td>October 31</td>
<td>October 31</td>
<td>October 31</td>
<td>October 31</td>
<td>October 31</td>
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<tr>
<td>Thanksgiving</td>
<td>November 22</td>
<td>November 23</td>
<td>November 22</td>
<td>November 23</td>
<td>November 22</td>
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<tr>
<td>Christmas</td>
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