Understanding Sheep Nutrition

August 26, 2014

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

Presenter:

Dr. Dan Morrical
Sheep Extension Specialist
Iowa State University

Host/Moderator: Jay Parsons
Feeding Sheep

Dr. Dan Morrical

515-294-2904

morrical@iastate.edu
What is the best thing to feed?

- Many would reply high quality alfalfa

Why
Feeding Sheep

Realistic and practical Facilities and equipment Flock size
What is 16% grower feed?

Feed that contains

16% crude protein.

Is it better than

14% finisher?

Feed tags list items on

an as fed basis
Feed Tags are State Controlled
T.M. SALT w/ Selenium

T.M. Salt for sheep

GUARANTEED ANALYSIS

<table>
<thead>
<tr>
<th>Element</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt, min</td>
<td>94.00%</td>
<td></td>
</tr>
<tr>
<td>Salt, max</td>
<td>95.00%</td>
<td></td>
</tr>
<tr>
<td>Zinc, min</td>
<td>0.60%</td>
<td>6000 PPM</td>
</tr>
<tr>
<td>Magnesium, min</td>
<td>0.52%</td>
<td>5200 PPM</td>
</tr>
<tr>
<td>Manganese, min</td>
<td>0.25%</td>
<td>2500 PPM</td>
</tr>
<tr>
<td>Iron, min</td>
<td>0.25%</td>
<td>2500 PPM</td>
</tr>
<tr>
<td>Iodine, min</td>
<td>0.01%</td>
<td>100 PPM short</td>
</tr>
<tr>
<td>Cobalt, min</td>
<td>0.003%</td>
<td>30 PPM</td>
</tr>
<tr>
<td>Selenium</td>
<td>90 PPM</td>
<td>.009% max.</td>
</tr>
</tbody>
</table>

PPM = mg/ kg

DGM:ISU:2012
INGREDIENTS

Salt, Vegetable Oil, Calcium Sulfate, Magnesium Oxide, Zinc Oxide, Ferrous Sulfate, Manganese Sulfate, Sodium Selenite, Cobalt Carbonate, Ethylenediamine Dihydroiodide, Sodium Molybdate.
FEEDING DIRECTIONS

Feed XXXXXX Sheep Trace Mineral Salt on a free choice basis to sheep. Do not permit excessive consumption. Intake of supplement trace mineral salt mixture should not exceed 0.3 PPM on a complete ration basis, or 0.69 milligrams per head per day. An intake of \( \frac{1}{4} \) oz. of this mineral per head daily will supply 0.63 milligrams.
What is in feeds?

- water (5-80% water)
- minerals (ash 1-4%)
- energy (TDN 40-85%)
  - forages more variable than grains
- protein (5-80%)
- vitamins
  - ADEK, B’s and C
## Iowa Hay Quality Survey

<table>
<thead>
<tr>
<th>Hay type</th>
<th>Crude protein</th>
<th>TDN</th>
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<tr>
<td></td>
<td>Ave.</td>
<td>Ave.</td>
</tr>
<tr>
<td>Grass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st cut</td>
<td>11.6 (6-20)</td>
<td>55.7 (47-67)</td>
</tr>
<tr>
<td>all others</td>
<td>15.2 (12-19.7)</td>
<td>61.8 (57-70)</td>
</tr>
<tr>
<td>Mixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>13.9 (8-22)</td>
<td>56.1 (41-69)</td>
</tr>
<tr>
<td>2nd</td>
<td>16.8 (10-22)</td>
<td>59.6 (47-70)</td>
</tr>
<tr>
<td>3rd</td>
<td>18.3 (11-23)</td>
<td>62.4 (49-73)</td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>16.9 (10-22)</td>
<td>56.7 (48-69)</td>
</tr>
<tr>
<td>2nd</td>
<td>18.3 (14-22)</td>
<td>57.7 (45-68)</td>
</tr>
<tr>
<td>3rd</td>
<td>19.9 (13-23)</td>
<td>59.4 (47-70)</td>
</tr>
</tbody>
</table>
Evaluating what to feed your sheep?

Cost

Nutrient density

Feeding waste

if they do not eat it is very expensive bedding.

No best feed

soybean hulls, alfalfa hay, shelled corn,

complete feed
How much will sheep eat?

Daily intakes

- ewes 2-5% body weight
- lactating ewes have highest
- lambs 3-6%
- goes down as lambs get heavier
  - 50 pounder 4-5%
  - 130 pounder 3-3.5%
Condition scoring

Evaluating ewes for fatness
Monitor changes
1-5 system
11% weight change =
one condition score
## Nutrient Requirements

### Reading those charts

<table>
<thead>
<tr>
<th></th>
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<td>2.3</td>
<td>1.26</td>
<td>2.07</td>
<td>0.22</td>
<td>2.3</td>
<td>2.3</td>
<td>2800</td>
<td>18</td>
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<tr>
<td></td>
<td>150</td>
<td>0.02</td>
<td>2.6</td>
<td>1.45</td>
<td>2.38</td>
<td>0.25</td>
<td>2.6</td>
<td>2.4</td>
<td>3210</td>
<td>19</td>
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<tr>
<td></td>
<td>175</td>
<td>0.02</td>
<td>2.9</td>
<td>1.62</td>
<td>2.66</td>
<td>0.28</td>
<td>2.9</td>
<td>2.7</td>
<td>3610</td>
<td>20</td>
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<tr>
<td></td>
<td>200</td>
<td>0.02</td>
<td>3.2</td>
<td>1.79</td>
<td>2.94</td>
<td>0.31</td>
<td>3.2</td>
<td>3.0</td>
<td>3990</td>
<td>21</td>
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<tr>
<td></td>
<td>225</td>
<td>0.02</td>
<td>3.5</td>
<td>1.96</td>
<td>3.21</td>
<td>0.33</td>
<td>3.5</td>
<td>3.2</td>
<td>4360</td>
<td>22</td>
</tr>
</tbody>
</table>

TDN is total digestible nutrients  
454 grams = 1 pound  
IU is international units  
NRC = National Research Council
Nutrient Requirements

- Using those charts
- ex. 175 ewe 1.62 TDN and .28 CP

- Alfalfa 50% TDN \( \frac{1.62}{.5} = 3.2 \text{ lbs.} \)
- \( 3.2 \times 16\% \text{CP} = .51 \text{ lbs. of CP} \)
- Sheep Brands Ration Software
What is your cheapest feed source ???

Iowa it is corn, maybe
Stages of Production intensive system

- **Maintenance**
  - weaning until 14 days pre-breeding
    - (138 days)

- **Flush/Flushing/Breeding**
  - 2 weeks pre-breeding till end of breeding
    - (49 days or more)

- **Early/mid gestation**
  - Completion of breeding until 4 weeks pre-lambing
    - (80 days or more)
Concerns During Early Mid Gestation

- 21 days of severe underfeeding
- 80 days of moderate underfeeding
- Both result in smaller placentas leading to reduced birthweights
Mid Gestation Nutrition Goals

- Maintain condition - mature ewes
- Yearlings and two year olds - increase condition
  - ISU data higher incidence of fetal loss
- Specific nutrients
  - Protein maybe
    - Other species - protein deficiency severely impacts placental size more than energy

Crop aftermath grazing or dormant range - ?? protein
Stages of Production

- Late gestation, second most important
  - singles 2 weeks
  - twins 3-4 weeks
  - triplets 4-6 weeks

- Early lactation, most important
  - 42 days

- Late lactation
  - 21 days

- Weaning ration
  - 7 days
Recommendations for LG Feeding

**Alfalfa hay based diets**
- Barley or other economical energy sources
- Guideline - 1 LB. concentrate per fetus

**Limit roughage intake**
- Mature ewes with 3 fetus or more
- All ewe lambs

**Low quality roughage as base ration require both protein and energy supplementation**

**Low energy diets with poor roughage's may respond to escape protein** - MLC, 1983
Late Gestation

Secretory tissue development occurs.
Larger placenta → more placenta lactogen.
Ewes with multiples have larger placenta weight.
Consequences of Underfeeding

- Weak, small lambs with high mortality
- Reduced colostrum quality and quantity
- Retarded weight gain both pre & post weaning
- Reduced peak milk yield and less total production
- Decreased re-breeding success
- Reduced wool production via fewer secondary follicles
Consequences of Overfeeding

- Thin wallets
- Fat ewes
- Upper limit on birthweight
Factors Which Affect Milk Production

Lactation Diet Energy Status
Lactation Diet Protein Status
Late Gestation Nutrition - precaution
Ewe Fatness or Condition
Prolificacy
What is a highly productive Ewe?
High producing ewes

- Twins or better
  - Moderate birth weight
- Raises them all
- 7.5 pounds of milk per day
twins gaining .75 lb birth to weaning
- Long lived
- Breeds back if desired
- Eats like a horse
Ewe Lambs

- Lamb at 12-14 months
- Group drop rate of >150% w/ 200% ideal
- Produce 4 pounds of milk
  - Lamb gain on twins of .4 lb/d birth to weaning
Feeding Management

Separate by need

Singles vs twins vs triplets

Age: ewe lambs vs mature

Early vs late lambers
Late Gestation Rations

175 pound ewe

<table>
<thead>
<tr>
<th>Component</th>
<th>13 lb S</th>
<th>11.5 lb Tw</th>
<th>9.5 lb Tr</th>
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</thead>
<tbody>
<tr>
<td>Brome/alfalfa&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Barley</td>
<td>1</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<sup>a</sup> Hay quality good, 13.9 % CP and 56% TDN

Trace mineral and Vitamin E
Late Gestation Rations

120 pound ewe lamb

<table>
<thead>
<tr>
<th>Commodity</th>
<th>S</th>
<th>Tw</th>
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<tbody>
<tr>
<td>Brome/alfalfa\textsuperscript{a}</td>
<td>2</td>
<td>1.75</td>
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<tr>
<td>Barley</td>
<td>1.5</td>
<td>2.25</td>
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\textsuperscript{a} Hay quality good, 13.9 % CP and 56% TDN

Trace mineral and Vitamin E
Lactation rations

175 pound ewe

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Twins</th>
<th>Triplets</th>
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<tbody>
<tr>
<td>Lamb gain</td>
<td>.75</td>
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<td></td>
<td>.5</td>
<td>.75</td>
<td>.4</td>
</tr>
<tr>
<td></td>
<td>.50</td>
<td></td>
<td>.50</td>
</tr>
<tr>
<td>Brome/alfalfa&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.5</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.5</td>
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</tr>
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<td></td>
<td>5.5</td>
<td>5.0</td>
<td></td>
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<tr>
<td>Barley</td>
<td>.75</td>
<td>1.0</td>
<td>1.0</td>
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<tr>
<td></td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybean meal</td>
<td>.3</td>
<td>.3</td>
<td>.7</td>
</tr>
<tr>
<td></td>
<td>.5</td>
<td>1.0</td>
<td></td>
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<sup>a</sup> Hay quality good, **13.9% CP and 56% TDN**

Trace mineral and Vitamin E
## Lactation Rations

### 125 lb ewe lamb

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Twin</th>
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<tbody>
<tr>
<td>Lamb gain</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Brome/alfalfa(^a)</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Barley</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

\(^a\) Hay quality good, 13.9% CP and 56% TDN

Trace mineral and Vitamin E
Low labor feeding system

Precautions with net wrap
Protein Sources

Intake protein

Microbial protein

.13 lb MP/lb TDN
Intake Protein

Undegraded (UIP)
Degraded (DIP)
## Value of Protein Sources for UDP

<table>
<thead>
<tr>
<th>Source</th>
<th>% CP</th>
<th>% UIP</th>
<th>UIP Conc. %</th>
</tr>
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<tbody>
<tr>
<td>Grass Pasture</td>
<td>6-20</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Alfalfa Hay</td>
<td>16-24</td>
<td>15</td>
<td>2.7</td>
</tr>
<tr>
<td>Barley</td>
<td>13.5</td>
<td>20</td>
<td>2.7</td>
</tr>
<tr>
<td>SBM 44, Solvent</td>
<td>44</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>SBM 44, Expeller</td>
<td>43</td>
<td>50</td>
<td>21.5</td>
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<tr>
<td>CGM</td>
<td>60</td>
<td>40</td>
<td>24</td>
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<tr>
<td>DDGS</td>
<td>28</td>
<td>55</td>
<td>15.4</td>
</tr>
<tr>
<td>Blood Meal</td>
<td>85</td>
<td>80</td>
<td>68</td>
</tr>
<tr>
<td>Fish Meal</td>
<td>60</td>
<td>40-80</td>
<td>24-48</td>
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## Milk Yield Results from Additional Protein

<table>
<thead>
<tr>
<th>Protein Source</th>
<th>Protein Added</th>
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<tbody>
<tr>
<td></td>
<td>.18 lbs.</td>
<td>.44 lbs.</td>
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</tr>
<tr>
<td>Urea</td>
<td>.29</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Nut meal</td>
<td>.88</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Soybean Meal</td>
<td>.88</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Meat &amp; Bone Meal</td>
<td>.88</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Linseed Meal</td>
<td>1.32</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Fish Meal</td>
<td>1.32</td>
<td>.55</td>
<td></td>
</tr>
<tr>
<td>Blood Meal</td>
<td>1.32</td>
<td>.74</td>
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</tr>
</tbody>
</table>

145 lb. ewes rearing twins fed base diet 2.67 TDN 11.6% CP

Gonzalez et al. 1982
Vitamin E

100 IU/day/head extra above feed E
14 d pre-lambing through 35 d lactation

Mineral source of E is inadequate
20 pounds of mineral mixed with
4 pounds of E (20K IU/lb)
assumes ½ ounce intake per day
Iodine

Lactation Ration = .8 ppm or mg/kg

Most mineral mixtures are short
needs to be 140 ppm in mineral with .5 ounce intake level

Solution free choice iodized salt
Summary

All phases of production are important

Correctly feeding the flock requires more than one pen

Adequate protein for placental development

LG prepares for lactation and adequate birth weights for high survival

Lactation takes both protein and energy, wt. loss hurts production
Summary

Sheep have limited to no nutritional wisdom.

They do not read fact sheets or NRC.

Shepherds have to make the decisions on what and how much to feed.
Next Webinar

Dr. Richard Ehrhardt
Sheep Extension Specialist
Michigan State University

September 23, 2014

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