Health and Reproduction

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Reproductive Failure

I see that you’re feeding cubed hay this winter, Bill.
Fertility + Prolificacy =

- A pregnant sheep
- A sheep with lambs
- A family with an umbrella and money falling from the sky
Tough and Resilient

Puberty?

Body Score 1

Body Score 2

Body Score 3

Body Score 4

Body Score 5
Critical Periods for the Ewe

- TDN Requirement (lb/d)
- Protein Requirement (lb/d)

50 days

Jan  Feb  Mar (lamb)  Apr  May  Jun  Jul  Aug (wean)  Sept  Oct (breed)  Nov  Dec
DM/hd/d

Production Stage:
- Maintenance
- Flushing
- Last 4 wk preg (twins)
- Early lactation (twins)

Lbs:
- 110
- 132
- 154

Graph showing DM/hd/d by production stage with the following data:
- Maintenance: Blue 2.2, Red 2.7, Green 2.7
- Flushing: Blue 3.3, Red 3.3, Green 3.3
- Last 4 wk preg (twins): Blue 3.3, Red 4.8, Green 4.8
- Early lactation (twins): Blue 5.0, Red 5.0, Green 5.0
TDN/hd/d

Production Stage

Maintenance | Flushing | Last 4 wk Preg (twins) | Early Lact (twins)

Lbs

- 110
- 132
- 154
CP/hd/d

Production Stage

Maintenance  Flushing  Last 4 wk Preg (twins)  Early Lact (twins)

Lbs

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8

110 132 154
Ca/hd/d

Maintenance
Flushing
Last 4 wk Preg (twins)
Early Lact (twins)

Production Stage

G Grams

- Maintenance: 2
- Flushing: 5
- Last 4 wk Preg (twins): 6
- Early Lact (twins): 9

Colors:
- Blue: 110
- Red: 132
- Green: 154
Production Stage

- Maintenance
- Flushing
- Last 4 wk Preg (twins)
- Early Lact (twins)

Growth

- Blue: 110
- Red: 132
- Green: 154
Pregnancy Toxemia

GLUCOSE from gluconeogenesis

Glycerol de-3-phosphate

Glycerol

Fatty Acids from fats cells

Body Metabolism with a Low Carbohydrate Ketogenic Diet

AMINO ACIDS from diet

GLUCOSE

Acetyl-CoA

2 Acetyl-CoA

Thiolase

Acetoacetyl-CoA

Acetyl-CoA synthase

beta-hydroxy-beta-methylglyutaryl-CoA (HMG-CoA)

HMG-CoA lyase

NADH

Non-enzymatic decarboxylation

D-beta-hydroxybutyrate dehydrogenase

Acetoacetate

Acetone

D-beta-hydroxybutyrate

KREB'S CYCLE

NAD

DL-1,2-propanediol (propylene glycol)

DL-lactaldehyde

DL-lactate

pyruvate

Acetyl-CoA

NADH

ADH

methylglyoxal

GSH

GLYXOLASE I, II

D-lactate

GLUCONEOGENESIS

glucose

PDH
Critical Periods for the Lamb

- **TDN Requirement** (lb/d)
- **Protein Requirement** (lb/d)

- **Critical Periods**
  - Feb (birth) to Apr: 50 days
  - May to Jul: 50 days

- Months: Jan, Feb, Mar (birth), Apr, May, Jun, Jul, Aug (wean), Sept, Oct (breed), Nov, Dec
Effects of Nutrition on the Lamb

- Age at puberty
- Ovulation rate
- Multiple births

**Good nutrition**
- Age at puberty: 5
- Ovulation rate: 3
- Multiple births: 2

**Poor nutrition**
- Age at puberty: 8
- Ovulation rate: 1
- Multiple births: 1
# Sheep Nutrient Requirements

## TABLE 1. Nutrient requirements of ewes at different stages of the production cycle.

<table>
<thead>
<tr>
<th></th>
<th>Body Weight</th>
<th>Weight Gain</th>
<th>DM per hd per d</th>
<th>Nutrients per hd per d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs</td>
<td>lbs/d</td>
<td>lbs</td>
<td>% of BW</td>
</tr>
<tr>
<td><strong>Ewe maintenance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>.02</td>
<td>2.2</td>
<td>2.0</td>
<td>1.2</td>
</tr>
<tr>
<td>132</td>
<td>.02</td>
<td>2.4</td>
<td>1.8</td>
<td>1.3</td>
</tr>
<tr>
<td>154</td>
<td>.02</td>
<td>2.6</td>
<td>1.7</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Flushing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>.22</td>
<td>3.5</td>
<td>3.2</td>
<td>2.1</td>
</tr>
<tr>
<td>132</td>
<td>.22</td>
<td>3.7</td>
<td>2.8</td>
<td>2.2</td>
</tr>
<tr>
<td>154</td>
<td>.22</td>
<td>4.0</td>
<td>2.6</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Last 4 weeks of pregnancy (twins)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>.50</td>
<td>3.7</td>
<td>3.4</td>
<td>2.4</td>
</tr>
<tr>
<td>132</td>
<td>.50</td>
<td>4.0</td>
<td>3.0</td>
<td>2.6</td>
</tr>
<tr>
<td>154</td>
<td>.50</td>
<td>4.2</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td><strong>Early lactation (twins)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>-.06</td>
<td>4.6</td>
<td>4.2</td>
<td>3.0</td>
</tr>
<tr>
<td>132</td>
<td>-.06</td>
<td>5.1</td>
<td>3.8</td>
<td>3.3</td>
</tr>
<tr>
<td>154</td>
<td>-.06</td>
<td>5.5</td>
<td>3.6</td>
<td>3.6</td>
</tr>
</tbody>
</table>
Bermuda grass pasture or mixed grass pastures should provide enough nutrients to meet the needs of your ewe.

<table>
<thead>
<tr>
<th>July/Aug Ewe</th>
<th>What she’s doing</th>
<th>DM needed</th>
<th>TDN</th>
<th>CP</th>
<th>Ca</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 lbs</td>
<td>Eating, sleeping, pooping</td>
<td>2.4 lbs</td>
<td>1.3 lbs</td>
<td>.23 lbs</td>
<td>2.3 g</td>
<td>2.1 g</td>
</tr>
</tbody>
</table>
Example

<table>
<thead>
<tr>
<th>Late Sept Ewe</th>
<th>What she’s doing</th>
<th>DM needed</th>
<th>TDN</th>
<th>CP</th>
<th>Ca</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 lbs</td>
<td>Getting ready for breeding</td>
<td>3.7 lbs</td>
<td>2.1 lbs</td>
<td>.34 lbs</td>
<td>5.5 g</td>
<td>2.9 g</td>
</tr>
</tbody>
</table>

If we assume that your pasture is meeting their maintenance requirements, you will need to provide:

- an additional 1.3 lbs of dry matter
- containing .9 lbs of TDN
- and .11 lbs of crude protein.

This translates into a feed that is 69% TDN and 8.5% crude protein, or a little less than 1.5 lbs of cracked corn per ewe per day for 10-14 days before breeding begins.
Example

<table>
<thead>
<tr>
<th>Dec/Jan Ewe</th>
<th>What she’s doing</th>
<th>DM needed</th>
<th>TDN</th>
<th>CP</th>
<th>Ca</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 lbs</td>
<td>Gestating twins, achieve BCS 3, twins developing prolificacy</td>
<td>4.0 lbs</td>
<td>3 lbs</td>
<td>.45 lbs</td>
<td>6.9 g</td>
<td>4 g</td>
</tr>
</tbody>
</table>

Hay 88% dry matter = 4.5 lbs of hay that is 65% TDN and 11% crude protein per ewe per day.

Bermudagrass hay in Arkansas averages about 52% TDN and 12.3% crude protein.

Have to substitute some grain (roughly .5 lb cracked corn in this example) for hay to provide enough energy in the diet.
### Example

<table>
<thead>
<tr>
<th>March Ewe</th>
<th>What she’s doing</th>
<th>DM needed</th>
<th>TDN</th>
<th>CP</th>
<th>Ca</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 lbs</td>
<td>Producing milk for twins/losing weight</td>
<td>5.1 lbs</td>
<td>3.3 lbs</td>
<td>.7 lbs</td>
<td>9.1 g</td>
<td>6.6 g</td>
</tr>
</tbody>
</table>

Good quality hay, cool season grasses or winter annuals should meet these requirements in March.

If you feed grain supplements at this time, they should make up no more than 1/3 of the ewe’s diet.
Summary

• Prolific breeders and remarkably resilient when it comes to fertility.

• The critical periods include the last 100 days of fetal development and the first 100 days of life, 6 months before breeding, and late pregnancy.

• Fortunately, these periods overlap to some degree, and focusing on proper winter and spring feeding will often be enough.

• Ewes should not be too thin, but they should not be allowed to become overly fat either.

• Flushing for 10 to 14 days before the breeding season can dramatically improve fertility and prolificacy of ewes in poor condition.
Great Job Dad! Any Questions Anybody?