Nutritional Management
Strategies for Small Ruminants

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Nutrition Program

Keep it simple

Meeting nutrient requirements for production stage
  ◦ Maintain body condition
  ◦ Lamb/kid healthy offspring
  ◦ Produce milk to support kid/lamb growth
  ◦ Rebreed = reproductive performance

Economical

Utilize forage as base
## Let's Compare

<table>
<thead>
<tr>
<th>Species</th>
<th>Rumen Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow</td>
<td>&gt; 25 gallons</td>
</tr>
<tr>
<td>Sheep</td>
<td>5 – 10 gallons</td>
</tr>
<tr>
<td>Goat</td>
<td>3 – 6 gallons</td>
</tr>
</tbody>
</table>
Sheep vs Goat

**SHEEP**
Selective Grazers – prefer grass and forbs

**GOATS**
Intermediate grazers – grass, forbs, browse selectors

Select for higher nutrient content = best parts only

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<table>
<thead>
<tr>
<th>C</th>
<th>S</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>Sheep</td>
<td>Goats</td>
<td>Horses</td>
</tr>
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</table>
Foraging Behavior

Observe grazing patterns
- Forage mostly in the morning and later afternoon/early evening

Mid-day hours
- Near water or shade
- Grazing all day, especially mid-day...forage availability may be limited

Grazing goats = select grasses with high protein, switch to browse if protein low

Photos: Greg Brann Soil Health and Grazing Specialist USDA
Matching to production

- Management decisions should match the stage of production the animal is in
- Gestation – **Nutrition** and health
- Kidding/Lambing – Shelter, health, **nutrition**, predator control
- Lactation – BCS, health, **nutrition**
- Weaning – increased stress, **nutrition**, culling, health
- Growing/Dry – **nutrition**, culling
- Manage separately: **nutrition**
Nutrition: Lynchpin

Quality of your nutrition will show in your animal’s performance

Basis of nutrition is forage/browse
  ◦ Intake is influenced by quality
  ◦ Quality of forage will be defined in what your animal produces
    ◦ Milk, meat, fiber, offspring
When tailoring a ration must consider the following:

- Age
- Breed
- Environmental Stress
- Milk production
- Activity level
- Parasitism
- Availability of feeds + costs

Management Objectives:
- Average daily gains
Strategies: Stage and Level

- Group by Body Condition Score
- Group by level and stage of production
- Physiological Status
Forage as your foundation

Successful nutrition based on forage...generally

Pasture
  ◦ Grasses
  ◦ Forbs
  ◦ Browse
  ◦ Range

Hay

Concentrates
Maximize pastures

Perform forage and soil analyses

Mixed swards
- Grasses + forbs + browse

Rotational grazing
- Extend grazing season
- Sacrifice if necessary

Strategic supplementation
<table>
<thead>
<tr>
<th>Warm Season</th>
<th>Cool Season (fall/spring)</th>
<th>Marginal Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>March</td>
<td>December</td>
</tr>
<tr>
<td>June</td>
<td>April</td>
<td>January</td>
</tr>
<tr>
<td>July</td>
<td>October</td>
<td>February</td>
</tr>
<tr>
<td>August</td>
<td>November</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td></td>
<td></td>
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Grazing management decisions

Lowered desired performance?
Time to cull
Dry lot animals
Lower stocking rates
Fertilize
Pasture renovations
The basics

• Energy
• Protein
• Minerals
• Vitamins
• Water
Energy

Necessary to fuel all bodily functions

Most common limiting factor
- Poor quality forage, inadequate intake
- Decreased production, reproductive failure, increased susceptibility to disease and parasites

Energy from carbohydrates and fats (<5%)
- Roughage, hay, browse
- Barley, corn, oats, wheat
- TDN = total digestible nutrients > 50 TDN value
Protein

Quantity more important than quality
- Rumen degradable – broken down by the microbes
  - High quality
- Rumen undegradable – bypasses the rumen to the small intestines

Common sources
- Cottonseed meal, soybean meal, sunflower = 40 – 50% CP
- Legumes = 12 – 20% CP
- Cool Season = 8 – 23%
- Warm Season = 5 – 18%
Energy + Protein

Must work synergistically to support the rumen
  ◦ Microbial Protein

Energy must be available to ‘unlock’ the protein
  ◦ Microbes must have a CHO source

Ruminants to not store excess protein
  ◦ Burned off or eliminated
  ◦ Avoid using protein as an energy source = TOO EXPENSIVE$\$\$
Protein (CP) requirement for different classes of meat goats

- Buck
- Dry doe - early gestation
- Dry doe - late gestation
- Lactating doe - avg milk
- Lactating doe - high milk
- Kids (ADG > 0.44 lb/day)
- Yearlings (60 lbs.)
Minerals + Vitamins

Essential for normal physiological functions and systems development

Production, reproduction, and immunity

Not static

Deficiency can lead to poor performance/health issues
Forage quality and goat requirements: protein

SLIDE: J-M LUGINBUHL
Maintenance

Mature, dry does and ewes

First 1/3 of gestation ~ 15 weeks
  ◦ Essential to maintain

Rams outside of breeding season
  ◦ Mature wethers

Low to medium quality forages/browse

Activity level increases, maintenance requirements increase

**Ewe Daily Requirements during Maintenance (Dry or Non-lactating Phase)**

Body weight = 175 lb.

Estimated DM intake per day as % live weight = 1.6%

Dry Matter (DM) Intake = 2.8 lb. per head per day
(175 lb. body weight x 1.6% or 175 x 0.016)

TDN = 1.6 lb.*  
CP = 0.27 lb.*  
Ca = 0.0060 lb.*  
P = 0.0062 lb.*
Pre-breeding considerations

• Few inputs, but must meet requirements

• Females = lost condition during lactation
  • High energy diet: Corn 0.5 - 1.0 lb/animal/day
  • High quality pasture: pull from legume pastures before breeding

• Aim for BCS 3

• Prolificacy affected by poor nutrition

• Puberty can be delayed if underconditioned

• Make culling decisions early
Flushed

Increase nutrition prior to breeding season
- Best done early
- Age, BCS, Breed
- High quality pasture: avoid alfalfa, clover
- Increase fed grain: 0.5 - 1.0 lb/head/day
  - DO NOT OVER FEED

If flock/herd already on high nutrition, flushing may not affect ovulation or lambing/kidding percentage
Gestation

First 15 weeks, maintenance diets

Placental and mammary gland development

Embryo implantation

Inadequate intake/nutrient requirements
  ◦ Low birth weights
  ◦ Low fat reserves for offspring
  ◦ Decreased milk yield
  ◦ Dystocia
  ◦ Calcium deficiencies
Late gestation considerations

Last 6-8 weeks = Critical Window
- 50% more feed, 5-10% for every additional fetus

2/3 fetal growth

Number of fetuses

Quality + Quantity of forages and feeds
- **Energy** and Protein

Body condition score; 3-3.5 ideal
- Body condition more important than body weight

**Ewe Daily Requirements, Late Gestation with Twins**

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<th>Requirement</th>
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<tr>
<td>Body weight (lb.)</td>
<td>175</td>
</tr>
<tr>
<td>% live weight</td>
<td>2.5%</td>
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<tr>
<td>Dry Matter Intake (lb. per head per day)</td>
<td>4.4</td>
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<tr>
<td>TDN (lb.)</td>
<td>2.9</td>
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<tr>
<td>CP (lb.)</td>
<td>0.49</td>
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<td>Ca (lb.)</td>
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Negative Energy Balance

Negative energy balance
Reproductive success linked to nutrition
Prioritization
Metabolizable energy
  ◦ Milk
  ◦ Regaining adipose tissue
  ◦ Pregnancy toxemia
    ◦ Nutritional stress
    ◦ Increased ketones, decreased glucose
Lactation

Greatest nutritional demand
- Loss between 5-7% BW, 0.5 BCS
- Young ewes/does
- Dams with multiple offspring

**Energy + Protein**

Underfed ewes/does wean lighter offspring

Peak milk production ~ 4 weeks post-partum

Optimize milk production

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Lactation Production Groups

Separate into production groups for feeding
- Singles = lowest nutritional requirements
- Twins = 20 – 40% more milk production
- Triplets = almost always supplement with grain/concentrate

Rules of Thumb
- 1 lb of grain/nursing offspring
- Access to best pastures
- Managing yearling ewes separate until first offspring weaned
- Dairy breeds may require more

Appropriate bunk space
- 16-20 inches
Did you notice the increases?

**Ewe Daily Requirements during Maintenance (Dry or Non-lactating Phase)**

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Creep feeding/grazing

Supplemental nutrition for nursing lambs/kids
- Early-born, early weaned
- Artificially reared
- Limited forages
- Under producing mammas

Introduce at least 2 weeks before weaning

More efficient to feed kids/lambs than increase milk production

Minimum 14% CP, > 18 – 20 CP
- Concentrates—cracked corn, soybean meal, rolled oats
- High quality pastures
- Highly palatable
Weaned Lambs/Kids

Wean by weight, not age
- 2.5 - 3 times birth weight

Dry feed consumption
- 1 % of body weight

Less expensive to feed kids/lambs than dams + offspring

Watch out for high grain finishing diets
- 10% of the diet should remain roughage
# Grain Finishing vs Pasture Finishing

## GRAIN FINISHING
- Improved feed efficiency
- Increased ADG
- Promotes accelerated lamb growth
- Internal parasites...
- Fatter carcasses
- Digestive disturbances

## PASTURE FINISHING
- Generally more economical
- Slower growth than grain finished
- Pasture management
- **Quality and Quantity**
- Internal parasites...
- Leaner carcasses
Leader-follower grazing

Graze animals with higher nutritional needs first

Lower nutrient need animals graze second

Best implemented when milk production decreasing

Forage quality/quantity are key
Assessing Nutritional Status

Body Condition Scoring

- Subjective measurement for evaluating muscle and fat covering
- Helps make management decisions
Assessing Nutritional Status

- Forage analyses
- Grazing behavior
- Fleece/Coat
  - Grubby, scruffy, rough
  - Minerals: calcium, phosphorus, iron
- Reduced reproductive performance
- Milk production
- Low birth weight offspring
Supplementation: Fill in the voids

Performance level/stage of production
- Achieve desired level

Supplement strategies = Utilization + Intake
- Protein
- Energy
- Mineral

Add to, not in place of

Don't forget the minerals!
Supplement, Not Substitute

Maximize available forage

- Quantity
  - Green – feed low protein, but provide additional energy

- Quality
  - Dry and Brown = low CP < 5%
  - Poor quality can limit intake – low protein

Browsing/grazing allow for 3 lbs of forage daily, but...

- Feed 1 lb supplement
- Consume 2.3 lbs forage

<table>
<thead>
<tr>
<th>Live weight</th>
<th>Amount Supplemented @ 0.5% BW</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>0.2</td>
</tr>
<tr>
<td>60</td>
<td>0.3</td>
</tr>
<tr>
<td>80</td>
<td>0.4</td>
</tr>
<tr>
<td>100</td>
<td>0.5</td>
</tr>
<tr>
<td>120</td>
<td>0.6</td>
</tr>
<tr>
<td>140</td>
<td>0.7</td>
</tr>
<tr>
<td>160</td>
<td>0.8</td>
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Supplement Sources

Tubs and Blocks = $$$ but reduce labor and are convenient

Pellets = easy to handle

Energy dense
- Corn
- Barley
- Soybean hulls
- Whole oats

Protein dense
- Cottonseed
- Pellets
When to begin, When to end

Appraisal
- Animal
- BCS
- Weighing
- FEC/FAMACHA
- Forages and Soils
- Quality and Quantity
- Testing analyses
- Dormant forages
- Extreme environmental conditions
Remember....

Your nutrition will dictate animal performance

Cannot overcome poor genetics, but we can help reach full genetic potential

Right nutrition at right stage = success = $$$$$

◦ Forage as base, supplement at strategic times
Questions?