Small Ruminant Nutrition Essentials

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Sheep and Goats

Although goats and sheep have several similarities, their nutrient requirements differ in several ways:

- grazing habits
- physical activities
- feed selection
- body composition
- metabolic disorders

Goats browse more than sheep, while sheep tend to be true grazers.
Classes of Nutrients

- Water
- Energy: Carbohydrates, simple and complex & Fats
- Protein
- Minerals
- Vitamins
Water

- Essential for life
- Dry doe 1.0 gallon per day
- Lactating doe 2.5 gallons per day
- Fresh green grass contributes water
- Clean water
- Factor in prevention or urinary calculi
Carbohydrates

- Sugars
- Complex
  - Starch in grains
  - Cellulose (fiber)
  - Cellulose highly digestible in young plants
- Fiber necessary for rumen health
Fats

- High energy content (2.25 > calorie density than corn)
- Forages low in fat, (usually adequate)
- Limit: (5 -6 % of total diet)
Providing Energy

- Energy: most expensive nutrient (volume)
- Pasture: least expensive source
- Hay
- Byproduct feeds: May cause mineral vitamin imbalance
- Commercial feed/TMR: most expensive
Protein

- Composed of amino acids
- Goat is efficient at using dietary protein
- Low quality forages require protein supplementation
- Goats are more subject to urea toxicity from non-protein nitrogen than cattle
Providing Protein

- Protein on *vegetative* pasture adequate

- Hay: Usually adequate; energy deficient

- Winter feeding concerns about protein level

- Protein supplements: most expensive per lb.
Vitamins

- Fat soluble  A,D,E,K
- Vitamin A deficient in bleached or weathered hay or stockpiled forage
- Vitamin D sunshine vitamin
- Vitamin E linked to Selenium
B Vitamins

- Water soluble
- Synthesized by rumen microbes

- Deficiency of thiamin:
  - Polioencephalomalacia
  - High concentrate diets
General Recommended Vitamin Levels

- Vitamin A   5,000 IU/lb
- Vitamin D   2,000 IU/lb
- Vitamin E   80 IU/lb
Providing for Vitamin Requirements

- Green grass/browse and sunshine
- Liver stores of vitamins
- Green leafy hay
- Mineral supplements
- Commercial feeds
- Injections
- **Read labels**
Problems With Goat Trace Mineral Nutrition

- Mineral requirements for goats are not well known
- May be breed differences in requirements
- Stress increases mineral requirements?
- Poor and variable intake of mineral supplements by goats
Problems With Goat Trace Mineral Nutrition

- Differences in forage mineral content
- Major affect by geology
- Soil pH affects mineral availability
- Plant species, stage of maturity and environment
Macro minerals

- Calcium
- Phosphorus
- Sodium
- Potassium
- Chloride
- Sulfur
- Magnesium
Calcium Level .4%

- Functions in bone, muscle and nerve contractions
- Deficiency causes rickets, bowed limbs, lameness
- Vitamin D necessary for calcium absorption
- Most forages are adequate in calcium (legumes high)
Phosphorus Level .3%

- Function in soft tissues and bone growth, body pH
- Expensive feed ingredient
- May be close to adequate if poultry manure has been applied
Magnesium Level .18-.4%

- Functions as a component of bones and function of nervous and muscle system

- Major deficiency symptom is grass tetany on lush cool-season pastures

- Feed palatable mineral with high level of magnesium
Potassium, Sodium, Chloride .8-2.0%

- Electrolytes in body
- Minerals lost in diarrhea
- Deficiency causes reduced growth, pica-depraved appetite, stiffness
- Salt is sodium chloride
- Potassium seldom deficient
Sulfur Level .2-.32%

- Functions in protein synthesis, milk and hair production

- Deficiency causes poor performance, hair loss, excessive saliva and tears

- Feeds with natural protein sources provide sufficient sulfur
Providing for Macromineral Requirements

- Helps to know hay and grass analysis

- Mineral supplement with min 12% calcium, 12% phosphorus?

- Read the label
Urinary Calculi Prevention

- No supplemental P
- Add Ca to 2.0-2.5 Ca:P ratio
- Plenty of clean/warm water
- Salt
- Ammonium chloride .5%
Problems With Goat Trace Mineral Nutrition

- Differences in forage mineral content
- Major affect by geology
- Soil pH affects mineral availability
- Plant species, stage of maturity and environment
- Goats consume a variety of plants
Trace minerals

- Iron, Iodine, Copper, Zinc, Molybdenum, Manganese, Selenium, Cobalt

- Regional dependent Selenium, Iodine, Copper

- Beef cattle recommendations

- Plant analysis

- Custom mineral formulation
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