Nutritional Management Strategies for Small Ruminants

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Nutrition Program

Keep it simple

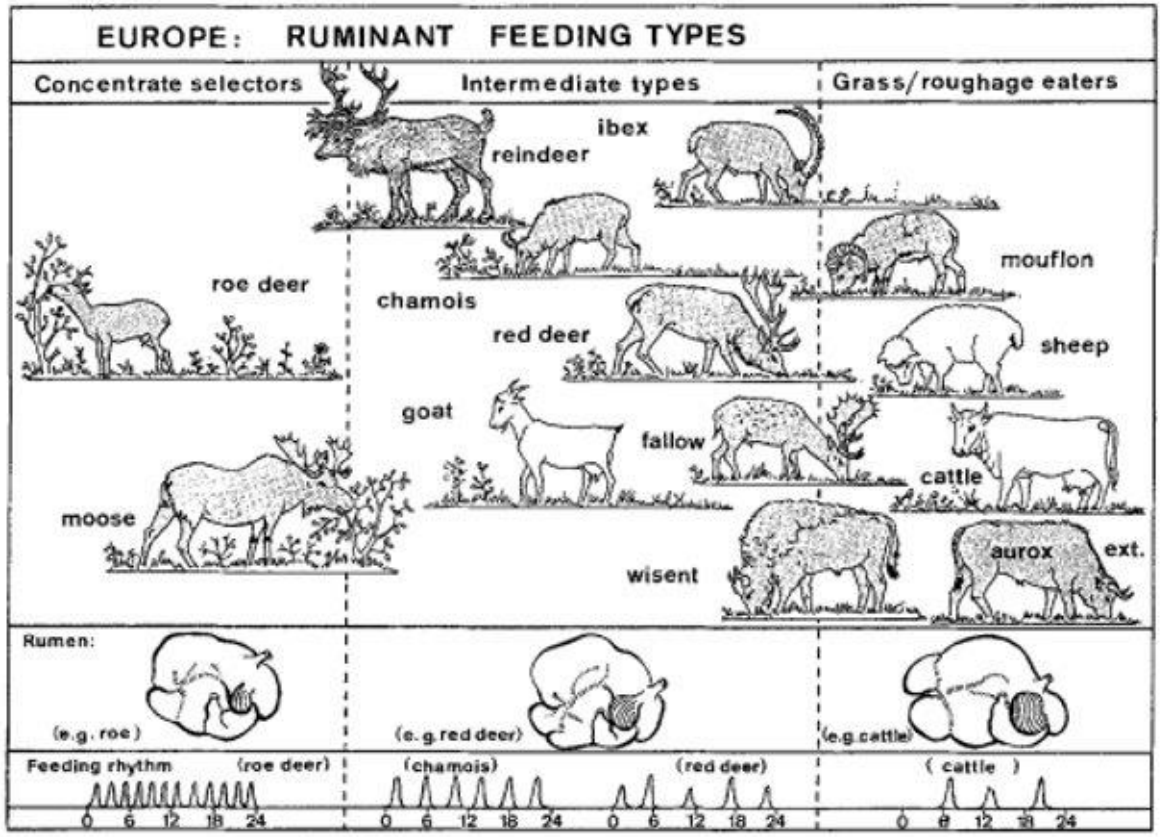
Meeting nutrient requirements for production stage

- Maintain body condition
- Lamb/kid healthy offspring
- Produce milk to support kid/lamb growth
- Rebreed = reproductive performance

Economical

Utilize forage as base

Species	Rumen Capacity
Cow	> 25 gallons
Sheep	5 – 10 gallons
Goat	3 – 6 gallons



Let's Compare

Sheep vs Goat

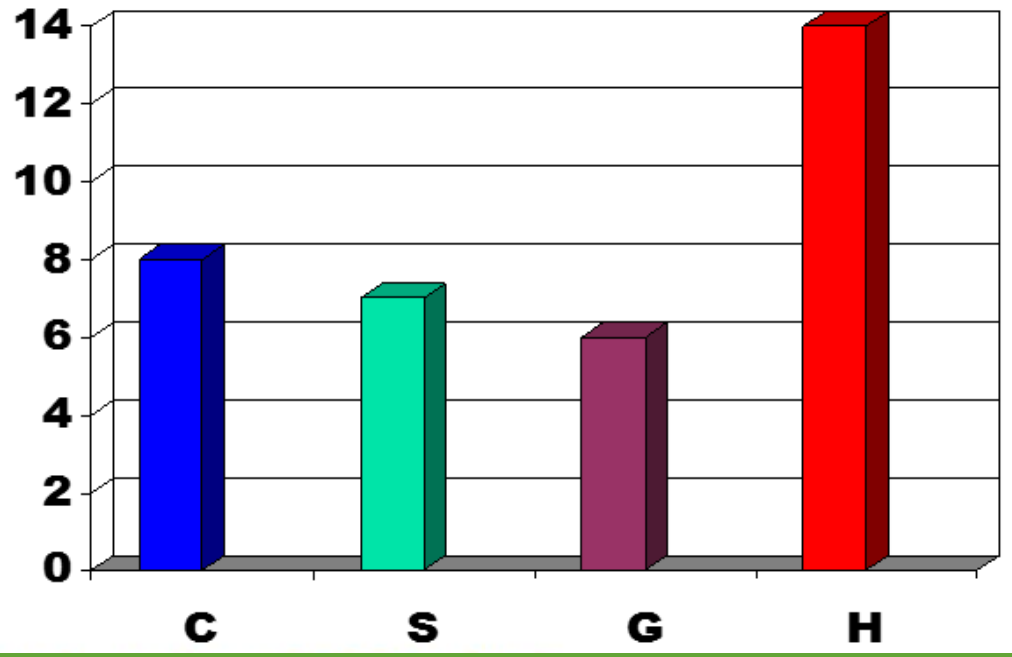
SHEEP

Selective Grazers – prefer grass and forbs

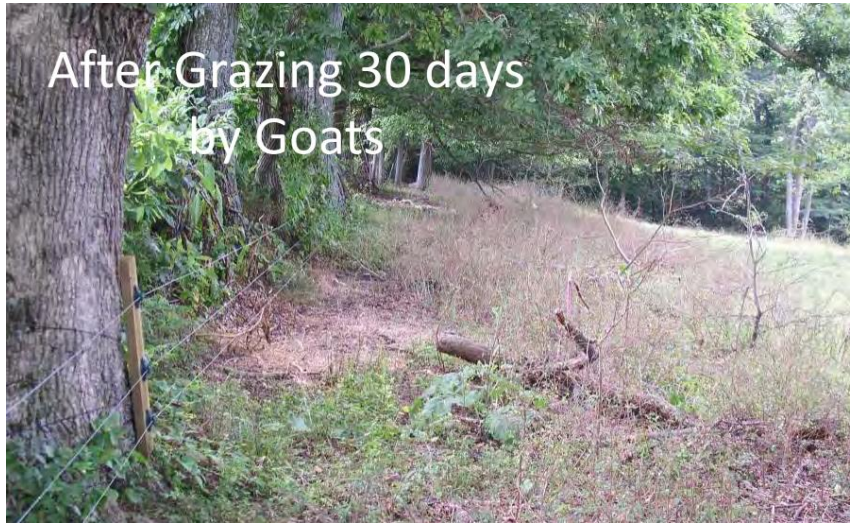
GOATS

Intermediate grazers – grass, forbs, browse selectors

Select for higher nutrient content = best parts only



C = Cattle
S = Sheep
G = Goats
H = Horses



Photos: Greg Brann Soil Health and Grazing Specialist USDA

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

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

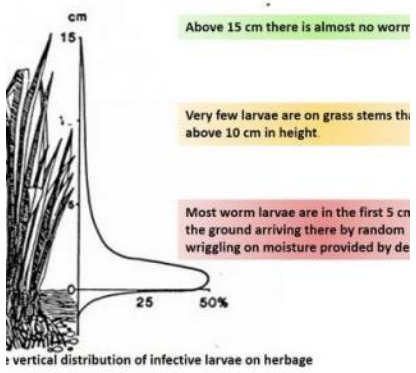
Maximize pastures

Table 2. Example of forage analysis result from bermudagrass hay sample (first cutting in 2006, fertilized with 80 lb N/acre) from producer in central Texas. (Soil, Water, and Forage Testing Laboratory, Texas A&M University, *http://soiltesting.tamu.edu*)

Item	Moisture	Dry matter (DM)
	%	
	As Received Basis	Dry Matter Basis
Moisture, %	5.9	0
Dry Matter, %	94.1	100
Crude Protein, %	9.7	10.3
Acid Det. Fiber, %	35.2	37.5
Neutral Det. Fiber, %	66.0	70.1
TDN Est., %	57.0	60.6

- Perform forage and soil analyses
- Mixed swards
  - Grasses + forbs + browse
- Rotational grazing
  - Extend grazing season
  - Sacrifice if necessary
- Strategic supplementation

Warm Season	Cool Season (fall/spring)	Marginal Growth
May	March	December
June	April	January
July	October	February
August	November	
September		



vertical distribution of infective larvae on herbage

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

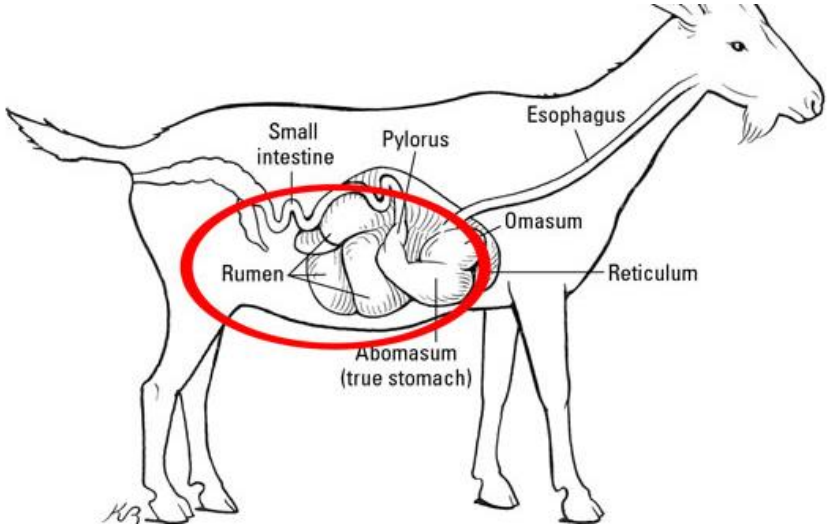
Protein

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

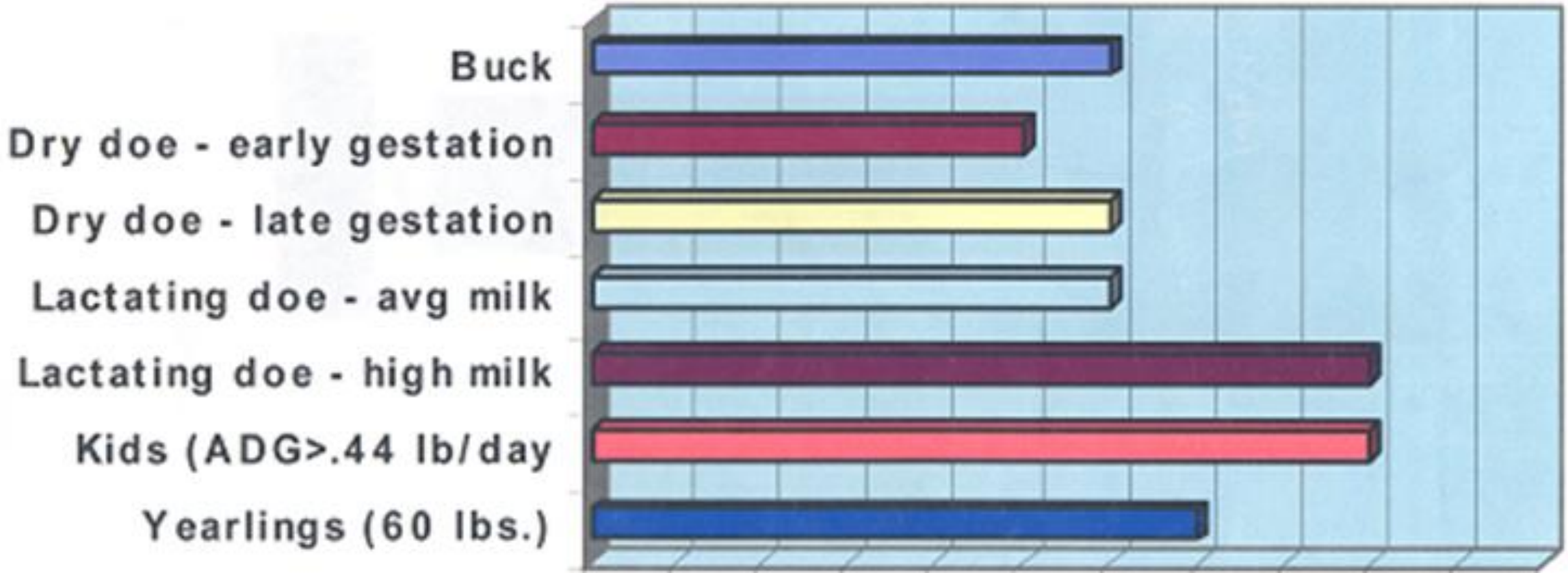
Energy must be available to 'unlock' the protein

- Microbes must have a CHO source

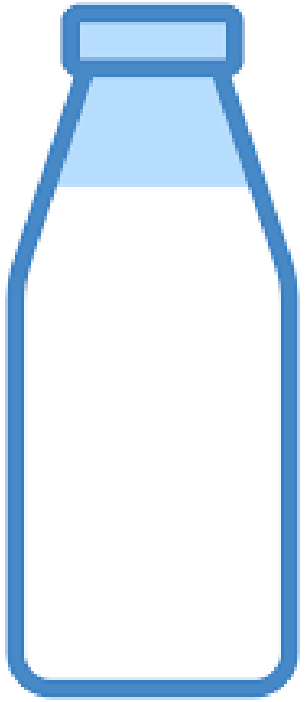
Ruminants to not store excess protein

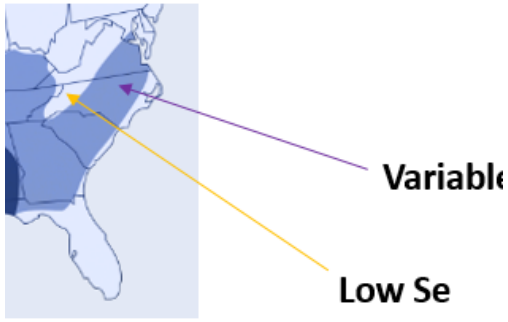
- Burned off or eliminated
- Avoid using protein as an energy source = TOO EXPENSIVE$$$$

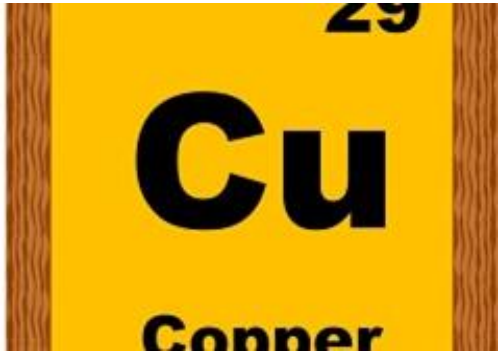
Protein (CP) requirement for different classes of meat goats



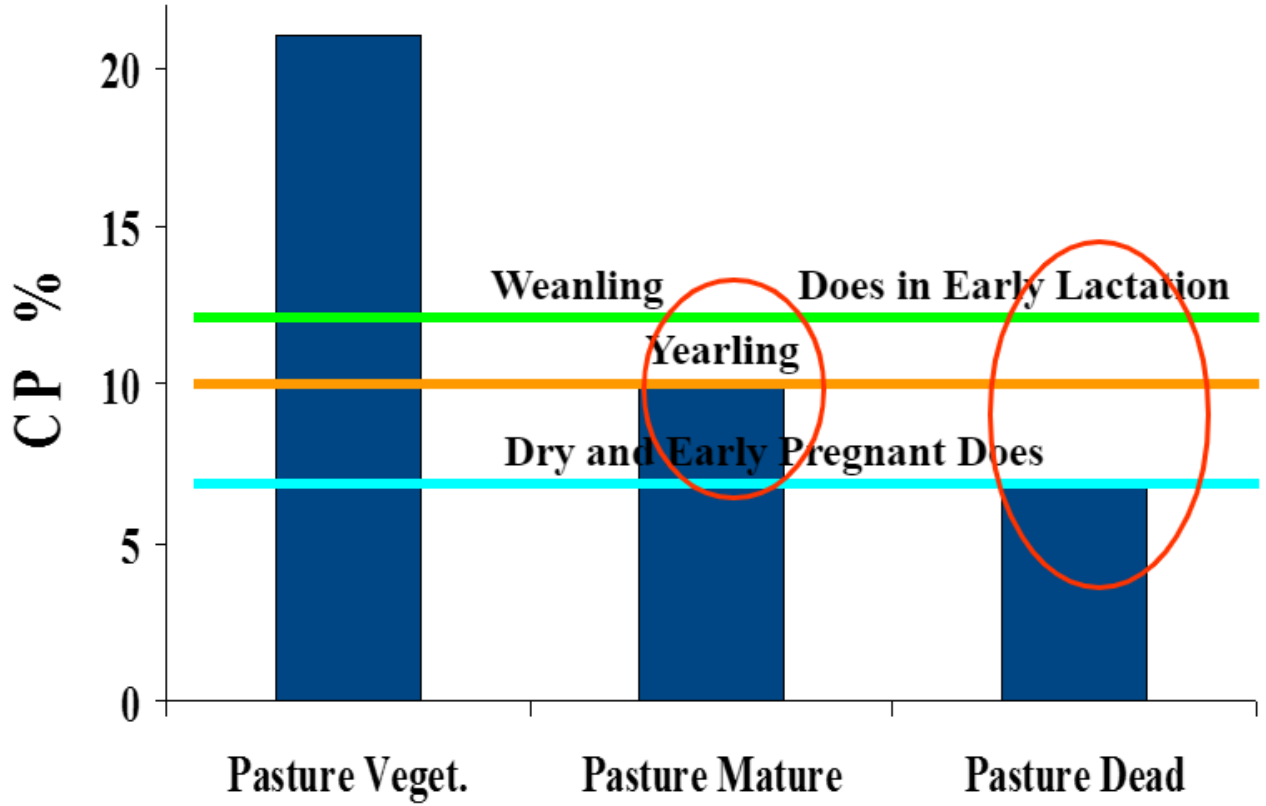
Minerals + Vitamins







- 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

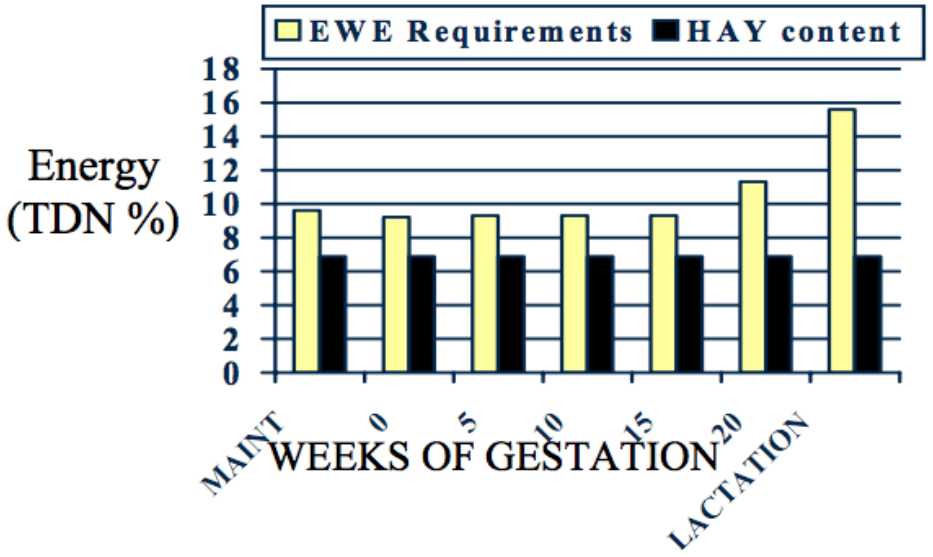
- Few inputs, but must meet requirements
- Females = lost condition during lactation
  - High energy diet: Corn 0.5 - 1.0 lb/animal/day
  - High quality pasture: pull from legume pastures before breeding
- Aim for BCS 3
- Prolificacy affected by poor nutrition
- Puberty can be delayed if underconditioned
- Make culling decisions early

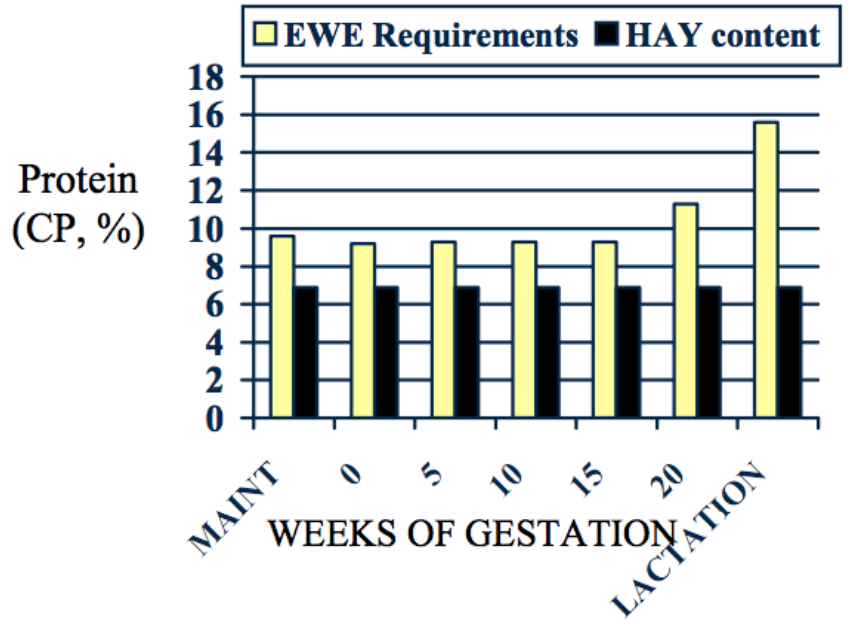
Flushing

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		
Body weight = 175 lb.	Dry Matter Intake = 4.4 lb. per head per day	
% live weight = 2.5%	TDN = 2.9 lb.	
CP = 0.49 lb.	Ca = 0.0183 lb.	P = 0.0112 lb.

Negative Energy Balance

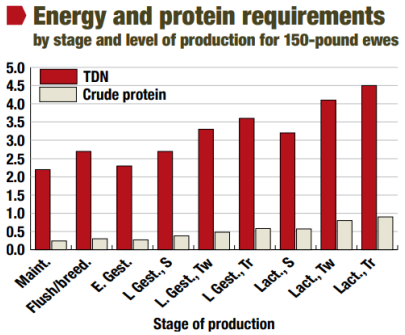
Negative energy balance

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

Ewe Daily Requirements, Early Lactation with Twins		
Body weight = 175 lb.	Dry Matter Intake = 6.6 lb. per head per day	
% live weight = 3.8%	TDN = 4.3 lb.	
CP = 0.96 lb.	Ca = 0.0247 lb.	P = 0.0189 lb.

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?

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Creep feeding/grazing

Supplemental nutrition for nursing lambs/kids

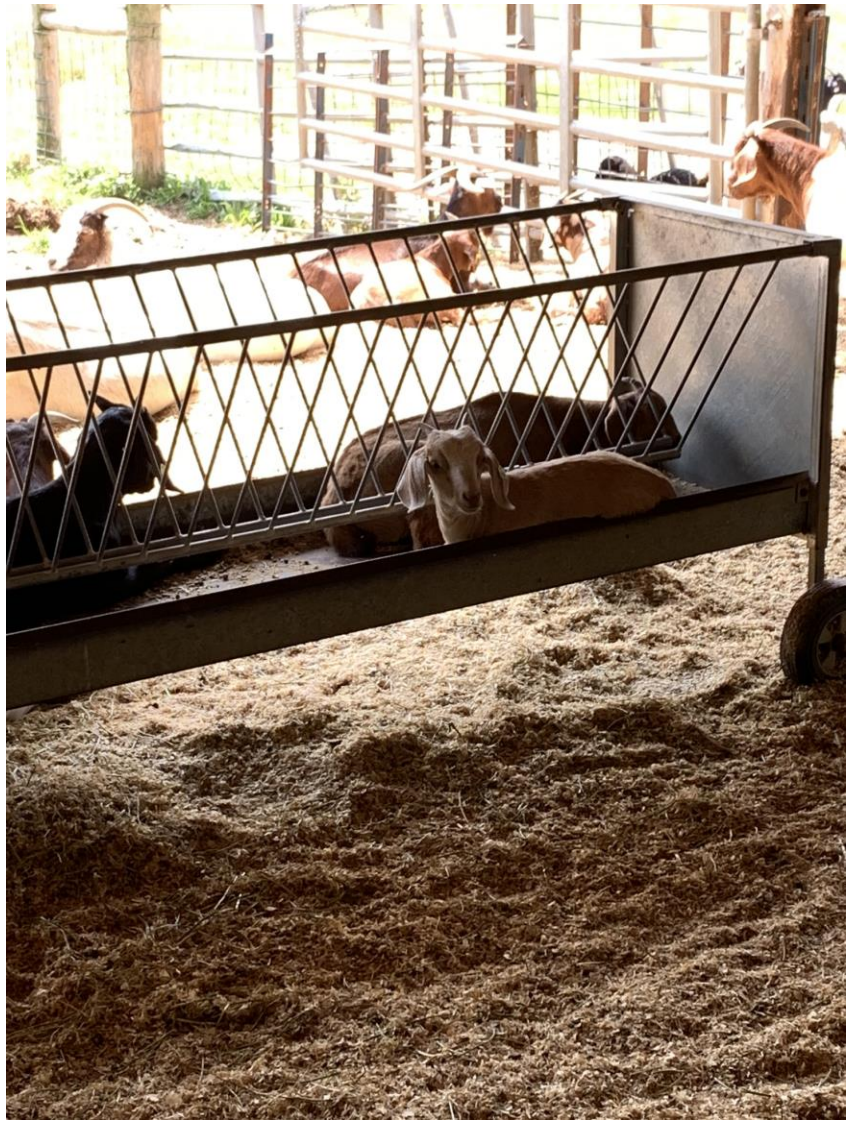
- Early-born, early weaned
- Artificially reared
- Limited forages
- Under producing mammas

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

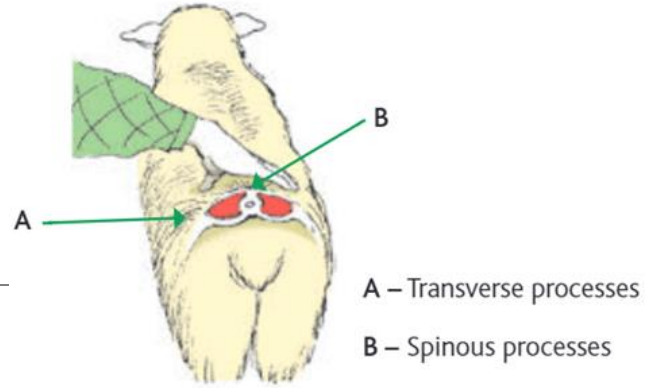
Graze animals with higher nutritional needs first

Lower nutrient need animals graze second

Best implemented when milk production decreasing

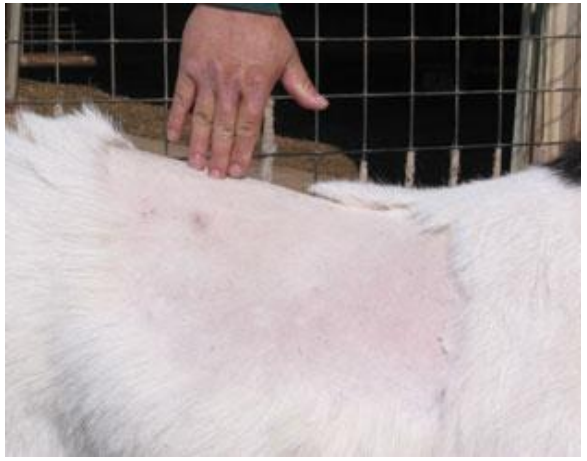
Forage quality/quantity are key

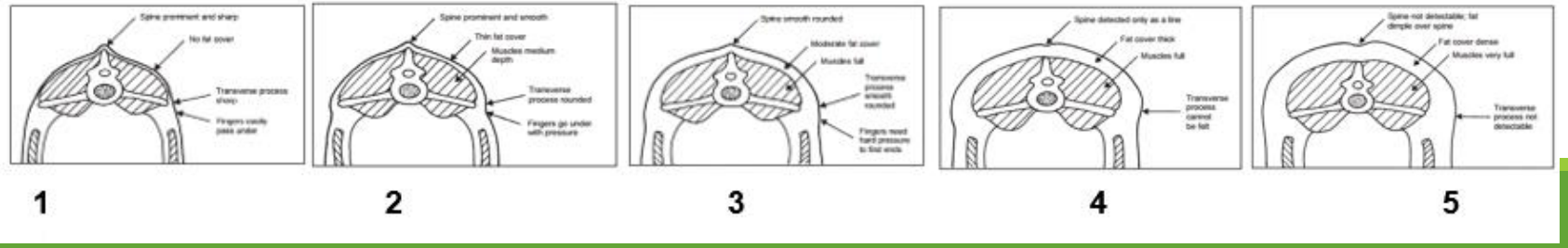
Assessing Nutritional Status

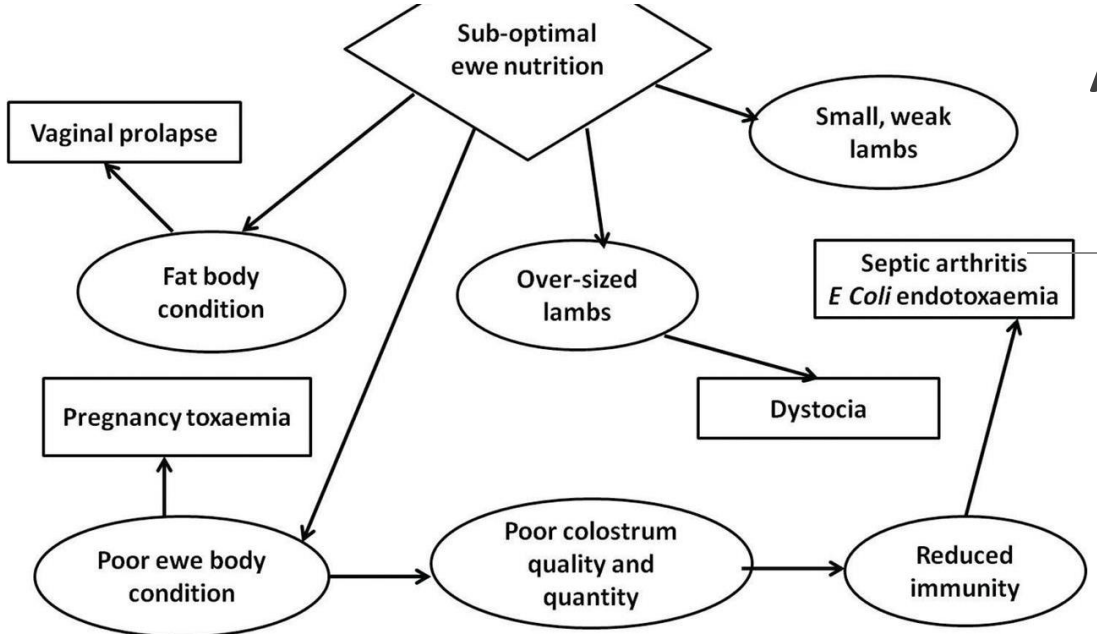


Body Condition Scoring

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







Assessing Nutritional Status

Forage analyses

Grazing behavior

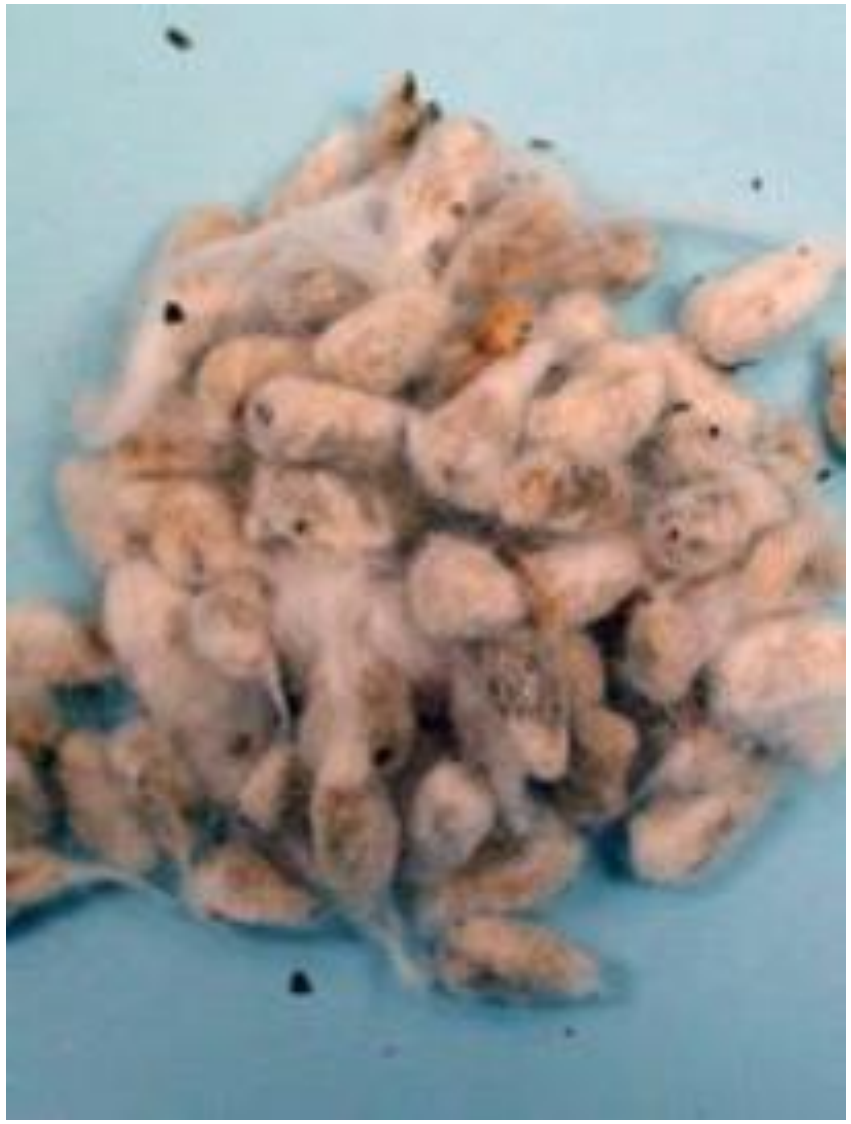
Fleece/Coat

- 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

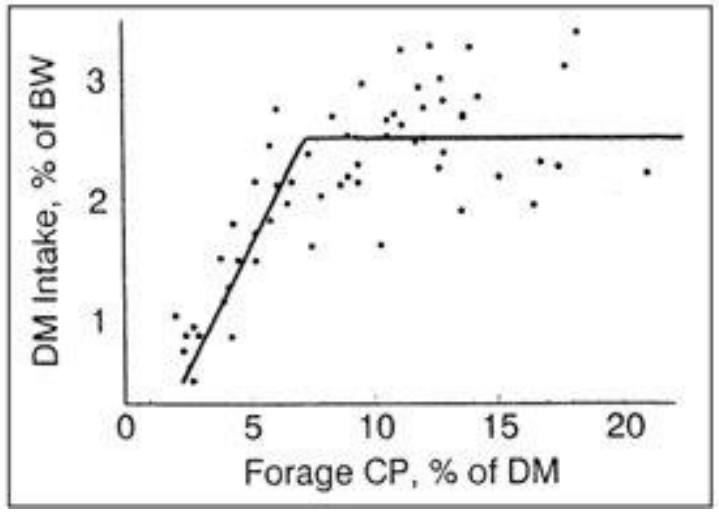
Supplement strategies = Utilization + Intake

- Protein
- Energy
- Mineral

Add to, not in place of

Don't forget the minerals!

Live weight	Amount Supplemented @ 0.5% BW
40	0.2
60	0.3
80	0.4
100	0.5
120	0.6
140	0.7
160	0.8



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

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

<u>Appraisal</u>

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

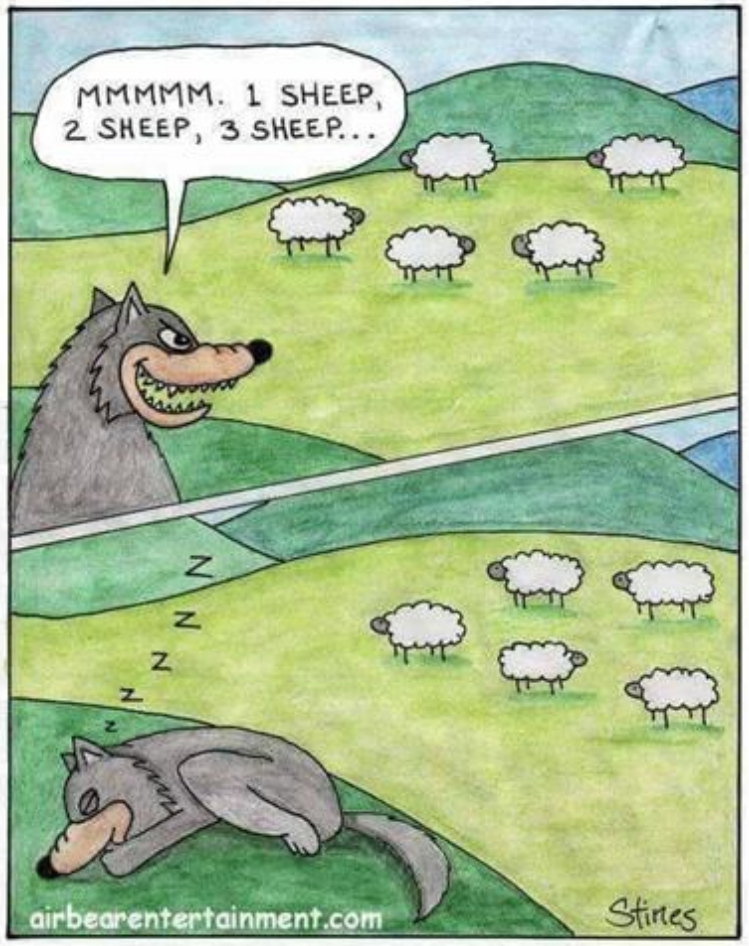
Remember….

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



THE SELF DEFENSE OF SHEEP

Questions?