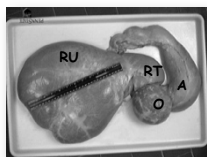


Diet Preference Animal Species	Type of Diet		
	Grasses (%)	Broadleaf weeds and legumes (%)	Browse (%) ¹
Cattle	65 - 75	20 - 30	5 - 10
Horses	70 - 80	15 - 25	0 - 5
Sheep	45 - 55	30 - 40	10 - 20
Goats	20 - 30	10 - 30	40 - 60
White-tail deer	10 - 30	30 - 50	30 - 50
Elk, red, and fallow deer	30 - 60	40 - 50	10 - 30

¹ Shrubs or trees:
 SOURCE: D. Forbes and G.W. Evers, Texas A&M Univ.;
 D.I. Bransby, Auburn Univ.; M.A. McCann, Virginia Tech Univ.; and W.R. Getz, Fort Valley State Univ.

Ruminant Digestive System

- Primary fermentation vat
- 5-10 gallons (mature goat)
- Contents in 3 layers: liquid, fibrous mat, gas
- Cud-chewing, saliva



IR



Rumen

- Papillae lining
- VFA absorption
 - Acetate, propionate, and butyrate
 - Propionate highest energy content
 - Acetate used in udder to produce milkfat



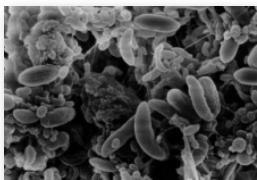
Reticulum

- Smaller fermentation pouch
- Assists in contractions
- Captures foreign objects



Rumen Microbes

- Bacteria, protozoa, and fungi
- 150+ species identified
- Five major groups:
 - Fiber fermenting bacteria
 - General purpose bacteria
 - NSC fermenting bacteria
 - Secondary feeders
 - Protozoa
- All working in harmony (if fed properly!)



Omasum

- "Many plies"
- Hardball-sized chamber
- Regulates particle passage from rumen
- Absorbs excess water from digesta



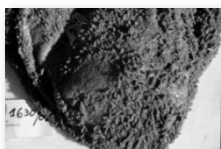
Abomasum

- "True" stomach - acid digestion
- Similar to humans and pigs
- Digestive enzymes, hydrochloric acid break down complex proteins and carbohydrates for absorption in small intestine

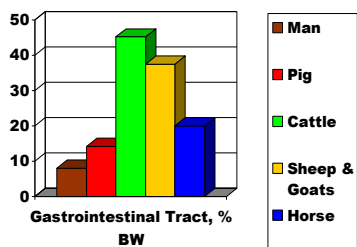


Rumen Dysfunctions

- Acidosis
 - Excess grain (starch), insufficient fiber results in overgrowth of lactic acid-producing bacteria, lowered rumen pH
 - Milkfat depression
 - Rumen damage
- Heat Stress
 - Decreased dry matter intake
 - Panting



Comparative Capacity of the GI Tract



FIVE Basic Classes of Nutrients

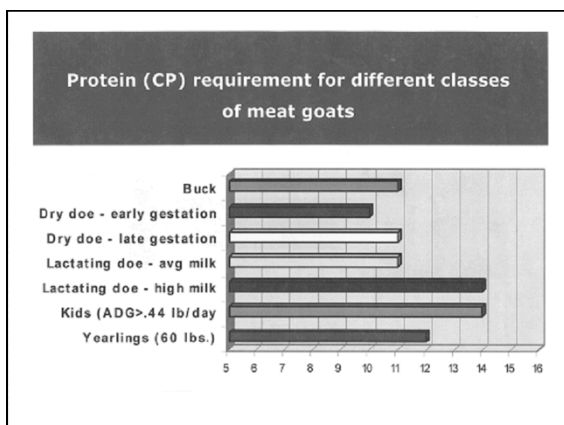
- WATER
- PROTEIN
- ENERGY (carbohydrates / fats)
- VITAMINS
- MINERALS

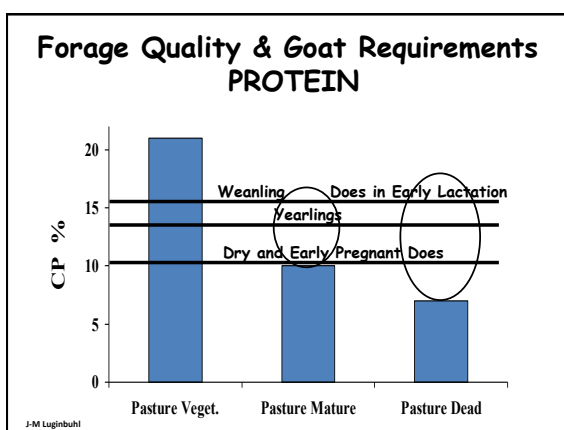
WATER

- The most important of the nutrients
- Fresh, Clean, ALWAYS available
- 1.5 gallons per head per day (doe)
- Deprived - loss of 1.5% BW in 4 days
- Decreased forage consumption
- Increased body temperature, respiration rate and pulse rate
- Milk production - 1:5 DM:Water ratio

PROTEIN

- The major component of muscle, hair, hooves, skin, internal organs and body chemicals
- Composed of smaller units, Amino Acids
- Goat rations balanced for protein rather than individual amino acids
- Rumen microbes digest most of protein and change it to microbial protein



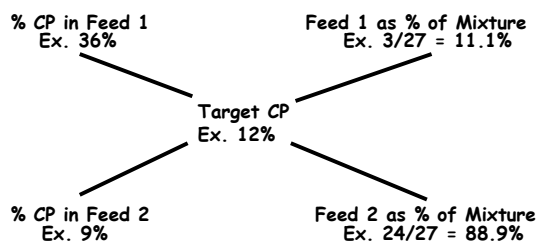


Energy Physiological Priorities

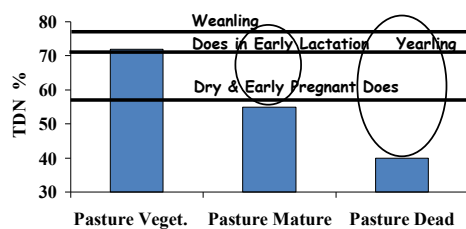
Energy - the number ONE effect on reproduction

- Basal metabolism
- Activity
- Growth
- Energy reserves
- Pregnancy
- Lactation
- Energy reserves (milk fat)
- Estrus cycle / Initiation of pregnancy
- Excess energy reserves

Pearson Square Method



Forage Quality & Goat Requirements (TDN- Total Digestible Nutrients)



J-M Luginbuhl

Nutrient Requirements

(on a dry matter basis)

	30 lb Kid*	60 lb Kid*
Daily Feed Intake, lb	2.0	3.0
TDN, %	68	65
Protein, %	14	12

*gaining 0.44 lb/day

Creep Feeding a Supplement





VITAMIN Supplement for Goats

- Organic elements
- Water Soluble - B's, C
- Fat Soluble - A, D, E, K
 - Energy metabolism
 - Protein Synthesis
 - Bone formation
 - Absorption
- Imbalance and metabolic diseases

MINERALS

- Skeletal formation
- Cellular activity
- Oxygen transport
- Chemical reactions
- Enzyme systems
- Fluid balance

MINERALS

- Inorganic elements
- Macro-minerals - Calcium, Phosphorus, Potassium, Sodium, Chloride, Magnesium, Sulfur
- Micro-minerals - Iron, Iodine, Zinc, Copper, Selenium
- Ratios - Ca:P (2:1) and Zn:Cu (4:1)
- Toxic, deficient, unabsorbable

Mineral Supplement for Goats

- Phosphorus = 8 - 10%
- Calcium = 2 x Phosphorus
- Copper = 2,000 ppm (higher or lower depending on consumption - organic sources preferable)
- Lower NaCl for goats (< 10%)
- Magnesium = 2-4% (maybe higher if grass tetany is problem)
- Selenium = 50 - 80 ppm

Mineral Supplement for Goats

- Cobalt - 40+ ppm
- Manganese - minimum 3,500 ppm
- Zinc - minimum 4,000 to 10,000 ppm

Sulfates more absorbable than carbonates than oxides

Chelate package - Zinc Methionine Complex

Consumption per head per day - 0.25 to 0.31 ounces

Kelp meal - feed free choice (Atlantic or cold water)

Mineral Supplement for Sheep

- **Copper - < 300 ppm (wool sheep)
- **Sulfur - 1,000 ppm
- Zinc - 1,000 ppm
- Cobalt - 20 ppm
- Iodine - 100 ppm
- **Selenium - 50 ppm

Body Condition Score (BCS)

BCS 2



Extremely thin
Spine and ribs visible
Sternum protruding
Skin on bone
"V" cavity at tailhead

BCS 7



Spinous processes not visible
Frame not visible
Sternum covered
Hooks and pins rounded
Flat between hooks

ENVIRONMENTAL STRESS

- Heat and Cold
- Weather (precipitation and humidity)
 - Nutrient density
- Quality of feed on offer
 - Predation
- Travel (activity)
 - Topography

Major Effects of THERMAL STRESS on Nutrient Requirements

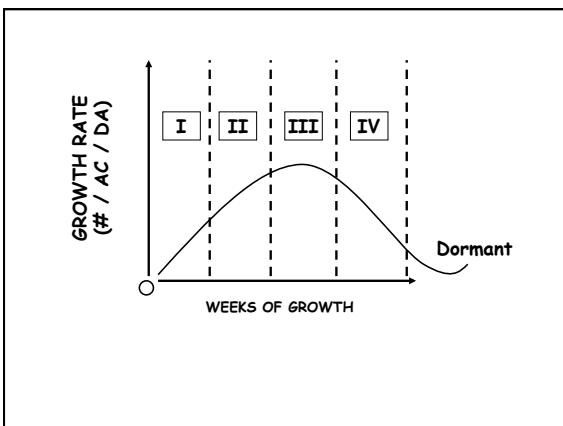
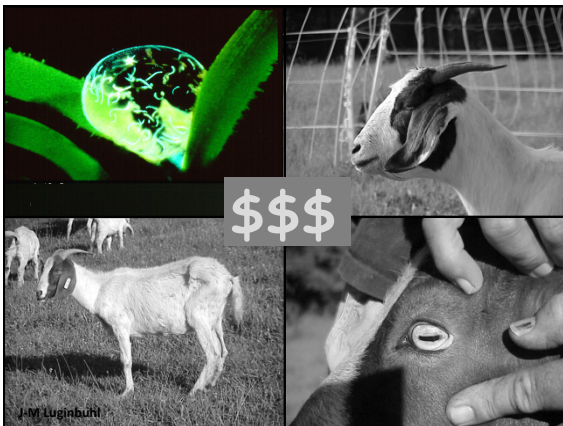
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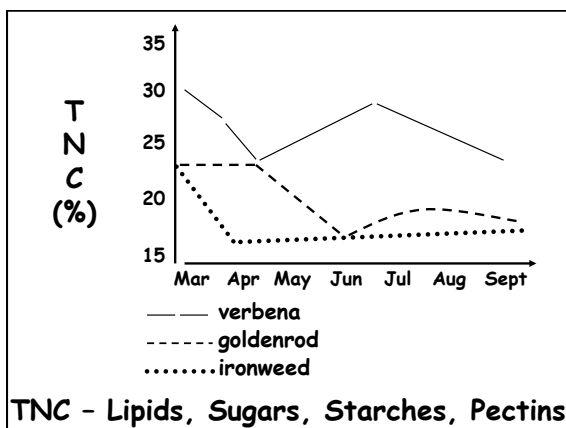
DEGREE of STRESS (affected by)

-
-
-
-
-
-

ECONOMIC LO\$\$

- both males and females
- Inability to maintain body condition score
- Decreased growth rate of off-spring
- Increased incidences of internal parasitism
- Suppressed immune system





Goat's Eye

- 1) Young green leaves / stems
70 - 75% digestible
20% CP
24 - 30 hour turn over rate
- 2) Old green leaves
60 - 65% digestible
4% CP
- 3) Dead / brown leaves
- 4) Mature stems
35% digestible
4% CP
72 hour turn over rate

Chemical composition of various plants browsed by goats (%)

Browse type	Crude protein	Neutral detergent fiber	Calcium	Phosphorous
<i>Multiflora rose</i>	18.8	34.5	0.99	0.32
<i>Honeysuckle</i>	12.8	34.5	1.21	0.30
<i>Brambles</i>	15.9	24.5	0.23	0.84
<i>Privet</i>	18.0	26.8	0.89	0.34
<i>Green briar</i>	17.0	39.5	0.60	0.18
<i>Kudzu leaves</i>	23.7			
<i>Trumpet creeper</i>	16.7	43.1	0.42	0.22

Browsing Calendar (based on the goat)			
Specie	Preferred Time	Not Preferred	Notes
Yellow Star Thistle	Leaf phase through seedhead production	Cane heads are dead & empty	All ages & classes select 1 st at various growth phases
Scotch Broom	Before flowering All fall die back	Flowering	Caution using young doelings & pregnant does
Chamise	Fall / winter / spring	Mid to late summer	
Buckeye	Fall as leaves die back & seeds drop	Green & productive	Toxic
Tamarisk	New shoots, Young branches	Old decayed plants	Continuously barking & trampling

Nutrition

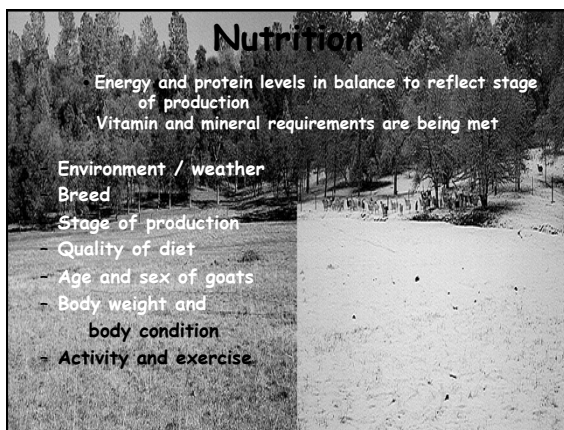
- Energy and protein levels in balance to reflect stage of production
- Vitamin and mineral requirements are being met

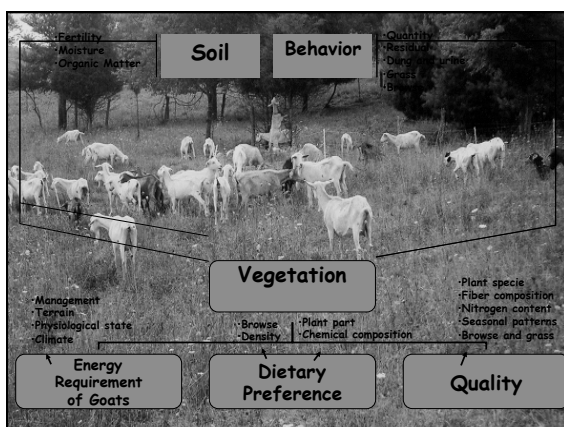
Environment / weather

Breed

Stage of production

- Quality of diet
- Age and sex of goats
- Body weight and body condition
- Activity and exercise








Electric Fencing

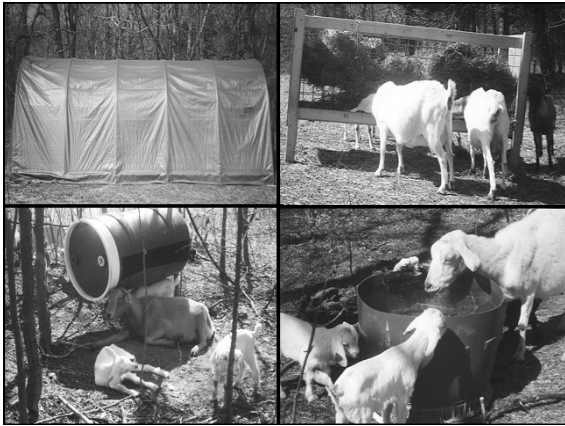
(Portable Solar Powered)

Maximize utilization of forage
Allocation based on forage quality and
physical condition of goat
Manage individual or mixed plant species



Maintain healthy environment for
vegetation and livestock







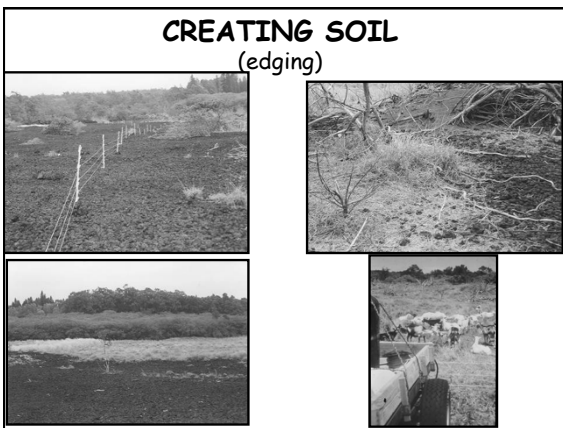


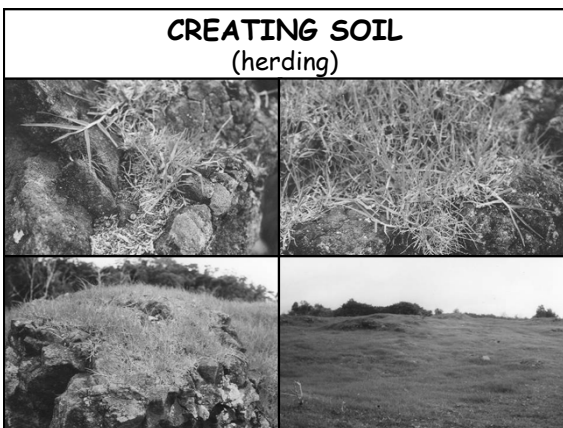




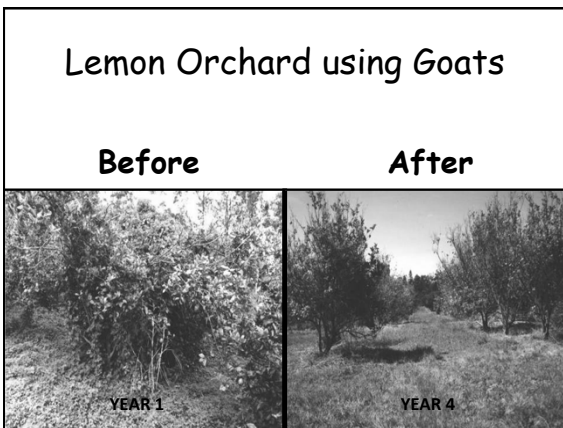


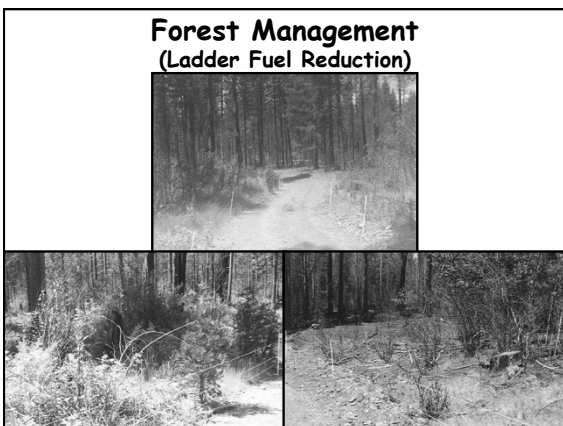




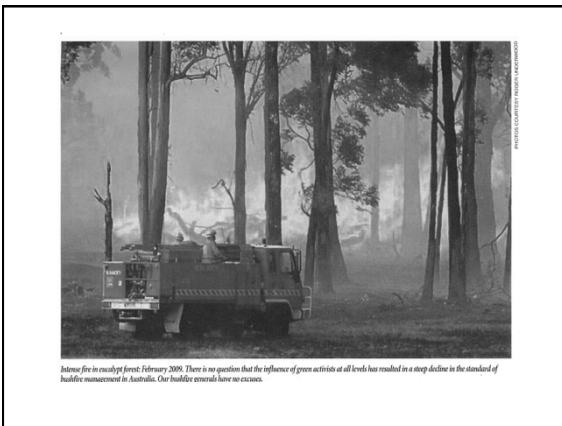






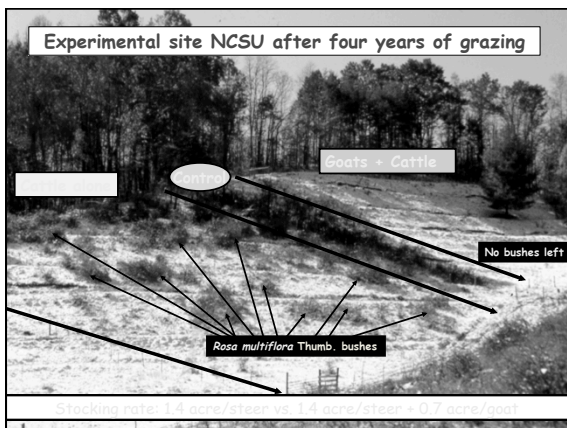






Intense fire in eucalypt forest: February 2009. There is no question that the influence of green activists at all levels has resulted in a steep decline in the standard of bushfire management in Australia. Our bushfire generals have no excuses.





Nutrition Management Tips

-
- doelings separate
- Care of gestating does based on stage of pregnancy (first/second/third trimester), post-kidding and dry does
- Mineral / vitamin balance (enhance immune system)
- Maintain body condition score

- INTER · RELATIONSHIPS -					
ITEM	PLANT	ANIMAL	SOIL	ECON-OMICS	SOCIAL
Herd Objectives					
Unit Size					
Feed on Offer					
Desired Residual					
Growth Rate					
Growing Conditions					
Animal Conditions					
Days Browsed					
Days Grazed					