

# **COWBOY NUTRITION AND IMMUNOLOGY**

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# TOPICS

- Immunology with a 4" brush
- Nutrition by the pound
- Parasitology for cowboys and ladies



# IMMUNOLOGY WITH A 4" BRUSH

- Protects body from outside invaders
- Stimulated by “Antigens” , usually outside protein
- Body stimulated to make Immunoglobulins to each Antigen
- Repeated exposure increases immunity (or NOT)
- Dependent on PROTEIN, minerals, and energy



# IMMUNOLOGY IS ORIGINAL SUICIDE BOMBER

- Immunoglobulins attach to and destroy invaders
- Helper cells stimulate White blood cells to attack invaders
- Continued response depends on supply line – protein, minerals, energy!
- Attack bacteria, viruses, fungi, parasites
- Can be overwhelmed by massive exposure or supply depletion



# TYPES OF IMMUNITY

- Passive- acquired from mother
  - By **colostrum** or in utero transfer
  - Very important to early survival and growth
  - Effective immediately, wains with time
  - Can be stimulated and increased by exposure
  - NUTRITION DEPENDENT
- Acquired- developed by exposure and response
  - Need 2-3 weeks to be fully developed initially
  - Repeated exposure boosts immunity levels in 2-3 days
  - Can be stimulated and increased by exposure
  - NUTRITION DEPENDENT



# WALKAROUND KNOWLEDGE-IMMUNITY

- Immunity is heavily nutrition dependent
- Genetics – if she's a thrifty, easy keeper, her daughter will be too.
- Immunity requires time and multiple exposure to develop



# COMPETITION FOR NUTRIENT RESOURCES

- Maintenance (Cold vs Hot)
  - Growth
  - Wool or hair growth
  - Reproduction
  - Finishing
  - Immune system
- Minimum levels of ALL nutrients are necessary for system to work properly



# NUTRITION BY THE POUND

- Animals consume 2-3% of their body weight daily
- Cow- 20-40 lbs/hd/day
- Ewe- 2-6 lbs/hd/day
- Moisture content effects nutrient density and intake



# NUTRIENT REQUIREMENTS VARY

- BODY SIZE
- Gestation
- Reproduction
- Growth
- Wool/hair growth
- Ambient temperature
- Precipitation
- Much higher in late gestation
- Higher in breeding season
- Higher in lactation
- Constantly high for wool/hair growth
- Higher in parasitized animals due to blood loss



# LIMITING NUTRIENTS (IF BELLY IS FULL)

- Water!
- Minerals (primarily Phosphorus)
- Protein
- Energy
- Quality matters!
- Natural vs NPN protein
- SBM vs CSM vs feather meal
- Absorbtion varies



**Table 1. Nutrient Requirements Of Sheep: Daily Nutrient Requirements Per Animal. (cont.)**

Body Wt. (lb.)	Avg. Daily Gain (lb.)	Dry Matter (lb./head <sup>a</sup> )	% Body Weight	Total Protein (lb.)	TDN <sup>b</sup> (lb.)	Ca (lb.)	P (lb.)	Vitamin A (IU)	Vitamin E (IU)
<b>Ewes (cont.)</b>									
<b>Flushing: 2 Weeks Prebreeding And First 3 Weeks Of Breeding</b>									
132	0.22	3.7	2.8	0.34	2.2	0.012	0.006	2820	26
198	0.22	4.4	2.2	0.39	2.6	0.013	0.008	4230	30
<b>Nonlactating, First 15 Weeks Of Gestation</b>									
132	0.07	2.9	2.2	0.27	1.6	0.007	0.005	2820	20
198	0.07	3.5	1.8	0.33	1.9	0.009	0.008	4230	24
<b>Last 4 Weeks Of Gestation (130-150% Lambing Rate Expected)</b>									
132	0.40	3.7	2.8	0.40	2.2	0.013	0.011	5100	26
198	0.40	4.4	2.2	0.47	2.5	0.014	0.014	7650	30
<b>Last 4 Weeks Of Gestation (180-225% Lambing Rate Expected)</b>									
132	0.50	4.0	3.0	0.45	2.6	0.015	0.008	5100	27
198	0.50	4.6	2.3	0.51	3.0	0.020	0.014	7650	32
<b>First 6-8 Weeks Of Lactation, Suckling Singles</b>									
132	-0.06	5.1	3.9	0.70	3.3	0.020	0.014	5100	34
198	-0.06	5.9	3.0	0.78	3.8	0.021	0.017	7650	40
<b>First 6-8 Weeks Of Lactation, Suckling Twins</b>									
132	-0.13	5.7	4.3	0.89	3.7	0.023	0.017	6000	39
198	-0.13	7.0	3.6	0.99	4.6	0.025	0.020	9000	48
<b>Last 4-6 Weeks Of Lactation, Suckling Singles</b>									
132	0.10	3.7	2.8	0.40	2.2	0.013	0.011	5100	26
198	0.10	4.4	2.2	0.47	2.5	0.014	0.014	7650	30
<b>Last 4-6 Weeks Of Lactation, Suckling Twins</b>									
132	0.20	5.1	3.8	0.70	3.3	0.020	0.014	5100	34
198	0.20	5.9	3.0	0.78	3.8	0.021	0.017	7650	40



## MARCH, HEAVY BRED 132#EWE,130% LAMBS, GOOD NATIVE PASTURE

- dry grass only
- 3.7# intake (dry) x .06 (6%) protein = .22# intake - .40# req'd = 0.18# deficit
- Feed 1# 20% protein feed per head per day = .20# protein
- Grass is 25% moisture adds .93# to intake.  $3.7\# + .93\# = 4.63\#$  total intake
- wet spring, with filaree
- 3.7# intake (dry) x .12(12%) protein = .44 #intake - .40 req'd = GOOD Immunity!
- No feed Req'd
- Grass/filaree is 45% moisture, adds 1.67# to intake.  $3.7 + 1.67 = 5.37\#$  total
- Consumption amount is critical on twin ewes- less abdominal space!!







**MARCH, HEAVY BRED EWE, 130% LAMBS, LITTLE OLD GRASS, LUSH GREEN SAPPY WEEDS, OR SMALL GRAIN**

- 80% moisture in forage, high protein
- Must consume large amount to get 20% of Dry matter
- $3.7\# \times 5$  (20% Dry Matter) = 14.80 # (not happening in late pregnancy!!)
- Add roughage (hay, cedar chips) to ration to raise DM intake.



# WALKAROUND KNOWLEDGE (PROTEIN)

- Cows need 1 lb/hd/day of protein supplement, in winter, adjusted to forage quality.
- Sheep need .2-.5 lb/hd/day of protein supp. in winter, adjusted to forage quality.
- Adjust for stage of production
- Add significantly if parasitized (or deworm!)



# MINERAL GENERALITIES

- Calcium is usually sufficient in grazing animals
- Phosphorus is generally deficient
- Copper, magnesium, manganese, selenium, zinc are usually deficient in trace amounts. THESE PLAY A HUGE ROLE IN IMMUNITY
- Few mineral excesses occur in Texas
- Copper is easily toxic in sheep- be careful of your mineral package for them!
- Blocks are convenient to use, but rarely get sufficient consumption amounts.
- Absorption is competitive between minerals





# MINERALS IN NURSING ANIMALS

- Neonates are born with liver stores to carry them thru 3-4 months of life
- Minerals are stored to the liver in utero, few are absorbed in milk.
- Mineral intake is limited until they start to consume vegetation and mineral supplements
- Good colostral antibody transfer and good mineral storage in the liver provide for good immunity and fewer health problems in early life.



## TESTING FOR MINERAL DEFICIENCIES

- Some minerals can be tested with blood samples – Calcium, Phosphorus, magnesium
- Most minerals can be efficiently tested with liver samples
- Post mortem liver samples should be frozen quickly and submitted frozen
- Liver biopsies in a herd setting can identify deficiencies/excess, and refine mineral supplement programs



# MINERAL SUPPLEMENTS

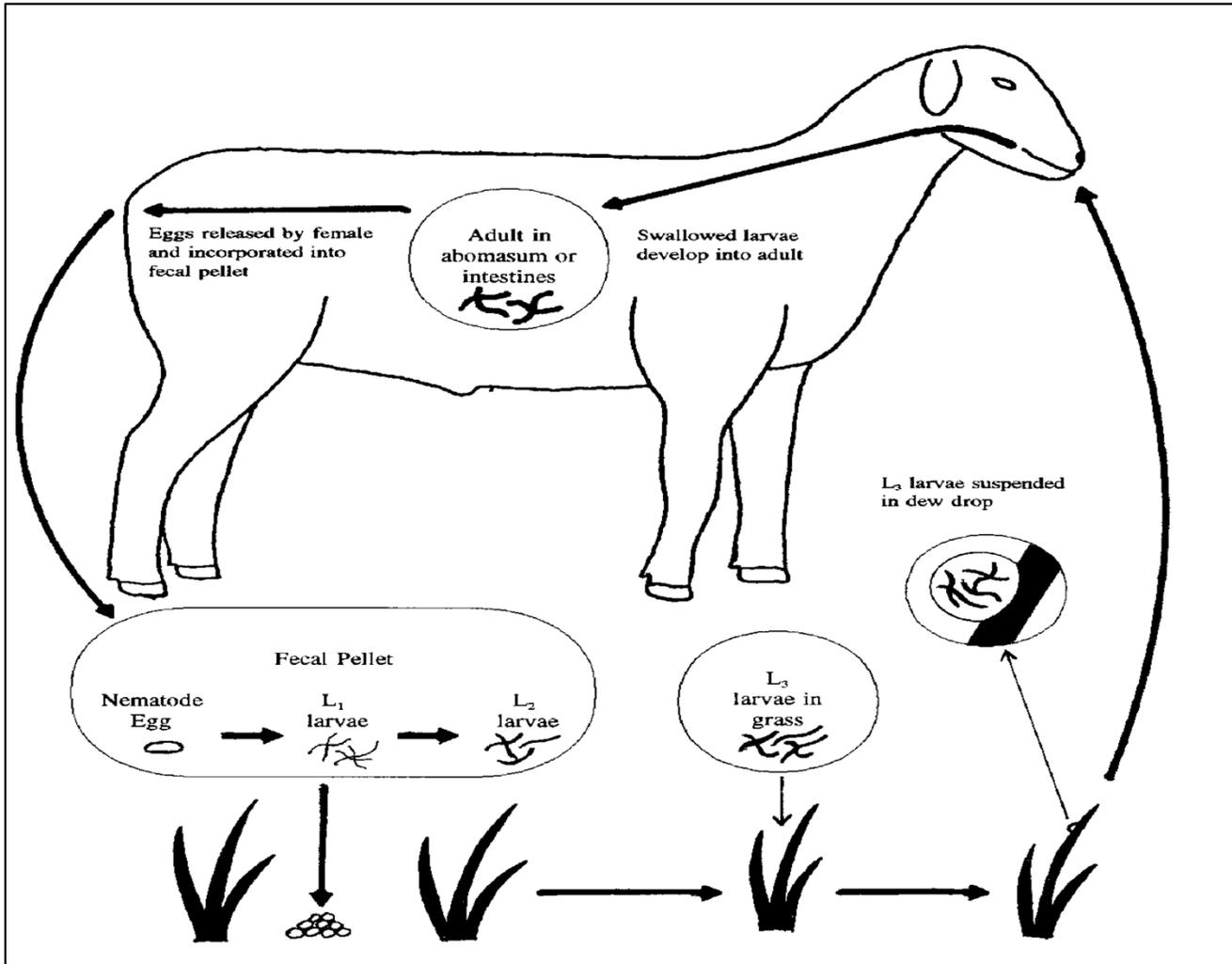
- Need a Ca:P ratio of 2:1 to 4:1
- Need a good trace mineral package
- Loose mineral with 20-30% salt to drive consumption.
- Monitor consumption and read the label. (ie 2-3 oz/hd/day)
- Expect variable consumption rates- heavy when growing rapidly, usually less as it dries out.
- Chemical form of mineral matters for absorption- oxides least absorbed, chelates highest.
- Good costs more!! But probably is better.

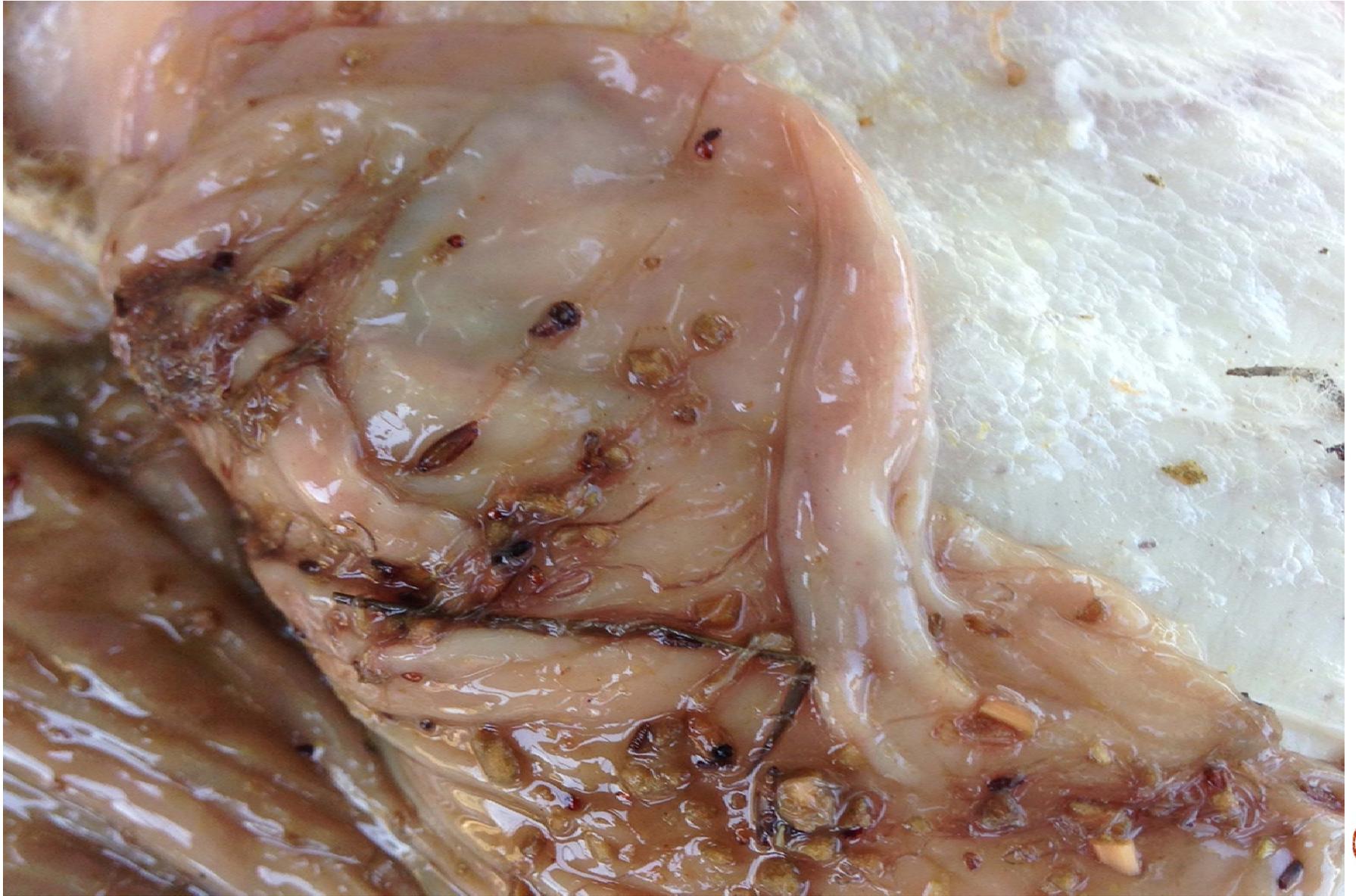


# PARASITOLOGY

- Nutrition and immunity play a huge role- can reduce parasite numbers and egg production
- Pasture management plays a huge role- the higher they graze, the less worm larvae they ingest. Long rest decreases parasite numbers.
- Selection and management to enhance resistance are key to control.
- Livestock species rotation provides a natural control measure: cows vs sheep & goats, cows vs horses, horse vs sheep & goats, cows vs deer.
- Forage or supplement with tannins, turpeens, may provide natural control
- Few new drugs are coming down the pike...







# PARASITOLOGY POINTS

- Need an inch of rain to melt fecal pills to release larvae onto grass
- Need dew drops on grass for larvae to swim up in order to be grazed/ingested
- Larval numbers increase logarithmically as graze nearer the ground
- Larvae die in 6 months or less, especially in hot and dry times
- Transmitted at over 45 degrees F
- Excellent survival with deep plant litter, moist cool conditions
- Host resistance reduces parasite survival and egg production



# DEWORMING POINTS

- Deworm when poor pasture survival conditions for worms exist, and you select for anthelmintic resistance!! (Hot, dry, cold)
- Deworm when parasite transmission and survival is high, and you effect the parasite gene pool much less (REFUGIA)
- Use monitoring with fecal egg counts to avoid unneeded deworming, and to assess the efficacy of deworming
- Use Famancha or production testing to select, cull, and sell low resistance animals!!!
- If they keep getting wormy, **Look at your nutrition and management!!**



