

Livestock Nutrition

Rocky Mountain Ag Conference; February 8, 2023



GOLDEN PLAINS AREA
COLORADO STATE UNIVERSITY
EXTENSION

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Learn more about CSU's Principles of Community and our Land Acknowledgement at colostate.edu.



Nutrition Levels

- They Change
 - Size and Age of Animal
 - Stage of Production
 - Time of year
 - Forage Availability
 - Environmental Conditions
- The Major Cost of Production
 - Land Values
 - Supplemental Feeds
- KMFA Data
 - Difference in High and Low Profit producers in marketing was \$62 per cow
 - Difference in Production Cost was up to \$350 pre cow



Water

- Most necessary and most overlooked nutrient
- Requirements
 - Mature Cattle (nonstressed) require 8 - 16 gal/hd/day
 - Mature Ewes nonstressed require 1 – 4 gal/hd/day
- Quality
 - > 2500 ppm Total Dissolved Solids
 - > 500 ppm Sulfates
 - > 100 – 200 ppm nitrates
- Mineral and Vitamin interactions
- <https://www.ndsu.edu/agriculture/extension/publications/livestock-water-quality>



Profitable Operations

- High Percent Calf or Lamb Crop
- Time Pregnant
 - 280 plus days for Cow
 - 148 plus days for Ewe
- 80 Day Cow Breed Back
- Varied for Sheep Operations
- Nutritional Level prior to birth and through breeding season is critical
- Theory of body reserves or “Make Mama Work”



Mature Cow Requirements

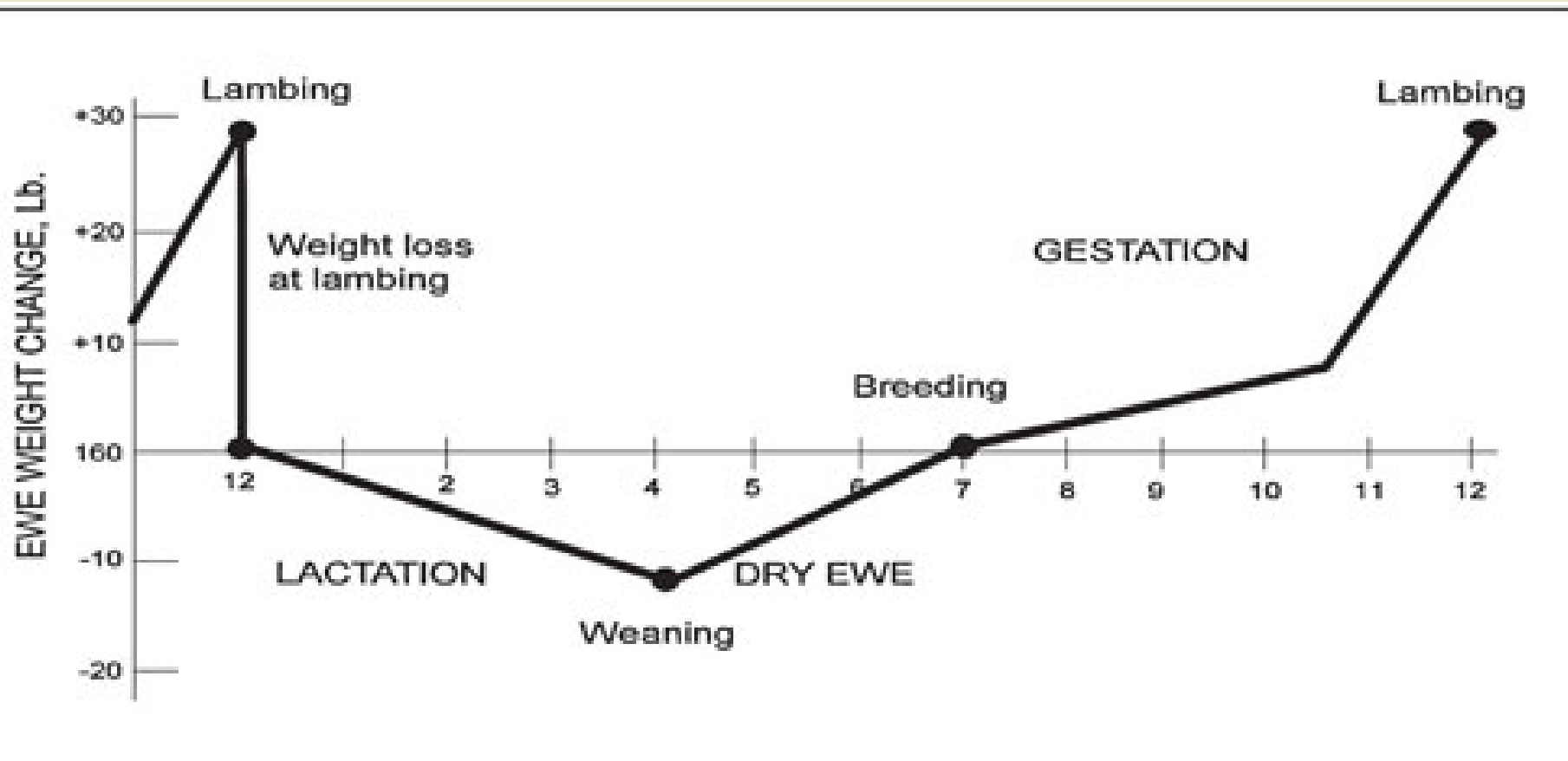
Table 1. 1200-pound cow; 20 pounds/day milk during peak lactation

Months since calving	DMI, lbs	TDN, %	TDN, lbs	CP, %	CP, lbs
1	26.8	58.7	15.7	10.1	2.7
2	27.8	59.9	16.7	10.7	3.0
3	28.4	57.6	16.4	9.9	2.8
4	27.4	56.2	15.4	9.3	2.5
5	26.5	54.7	14.5	8.5	2.3
6	25.7	53.4	13.7	7.9	2.0
7	24.2	44.9	10.9	6.0	1.5
8	24.1	45.0	11.0	6.2	1.5
9	24.0	47.1	11.3	6.5	1.6
10	23.9	49.3	11.8	7.0	1.7
11	24.1	52.3	12.6	7.7	1.9
12	24.6	56.2	13.8	8.8	2.2

DMI=Dry Matter Intake TDN=Total Digestible Nutrients CP=Crude Protein
 Adaptable from 1996 Nutrient Requirements of Beef Cattle.

- Energy and Protein are limiting and Expensive
- 1200 lb. Mature Cow
- 20 lb. Milk is average range for beef cow
- Feed Analysis my return Digestible Energy (DE)
 - $DE = .02 \times \%TDN$
- Think of it Like a Traffic Light for BCS Changes





Mature Ewes

- Different Production Cycle
- Increased requirement for Multiple Births
- Requirements for 150 lb. Ewe
- Need to be in a “Positive Energy Balance” prior to breeding (Flushing Effect)

Table 1. Guidelines for feeding ewes.

150 lb Ewe	TDN	Protein
Early Gestation	1.7 lb	0.3 lb
Late Gestation	2.7 lb	0.4 lb
Lactation	3.7 lb	0.8 lb



Description : ALFALFA

	Analysis As Received	Analysis Dry Basis
Moisture, %	11.44	0.00
Dry Matter, %	88.56	100.00
PROTEIN		
Crude Protein, %	20.3	22.9
FIBERS		
Acid Detergent Fiber, %	25.0	28.2
Neutral Detergent Fiber, %	29.4	33.2
NDFD (digestibility) 48 hr, % of NDF		51
IVTDMD (in vitro true digestibility) 48 hr, %	73.1	82.6
ENERGIES		
TDN Est., %	54.2	61.2
Net Energy Lact, MCal/lb	0.5539	0.6254
Net Energy Maint, MCal/lb	0.5427	0.6128
Net Energy Gain, MCal/lb	0.3108	0.3509
QUALITY VALUE		
Relative Feed Value		187
Relative Forage Quality		202
MINERALS		
Calcium, % Ca	1.23	1.39
Phosphorus, % P	0.27	0.30

La Jara Hay

- Last Trimester before calving
 - 2 lbs. CP and 12.5 lbs. TDN
 - Intake 24 lbs
 - 20.4 lbs to meet Energy
 - 8.75 lbs to meet CP
- Peak Lactation and Breeding
 - 3 lbs. CP and 16.7 lbs. TDN
 - Intake 27.8 lbs
 - 27.25 lbs to meet Energy
 - 13.1 lbs to meet CP
- **Always Check CA and P to 2:1**



Description : ALFALFA

	Analysis As Received	Analysis Dry Basis
Moisture, %	10.01	0.00
Dry Matter, %	89.99	100.00
PROTEIN		
Crude Protein, %	21.8	24.3 ↑
FIBERS		
Acid Detergent Fiber, %	28.9	32.1
Neutral Detergent Fiber, %	33.4	37.1
NDFD (digestibility) 48 hr, % of NDF		51
IVTDMD (in vitro true digestibility) 48 hr, %	72.7	80.8
ENERGIES		
TDN Est., %	52.4	58.3 ↓
Net Energy Lact, MCal/lb	0.5338	0.5932
Net Energy Maint, MCal/lb	0.5120	0.5690
Net Energy Gain, MCal/lb	0.2799	0.3110
QUALITY VALUE		
Relative Feed Value		160
Relative Forage Quality		178
MINERALS		
Calcium, % Ca	1.13	1.26
Phosphorus, % P	0.32	0.36

La Jara Hay 2nd

- Last Trimester before calving
 - 2 lbs. CP and 12.5 lbs. TDN
 - Intake 24 lbs
 - 21.4 lbs to meet Energy + 1
 - 8.25 lbs to meet CP -.5
- Peak Lactation and Breeding
 - 3 lbs. CP and 16.7 lbs. TDN
 - Intake 27.8 lbs
 - 28.65 lbs to meet Energy +1.4
 - 12.3 lbs to meet CP - .75
- **Always Check CA and P to 2:1**



Description : TRITICALE

	Analysis As Received	Analysis Dry Basis
Moisture, %	7.71	0.00
Dry Matter, %	92.29	100.00
PROTEIN		
Crude Protein, %	9.2	10.0
FIBERS		
Acid Detergent Fiber, %	34.4	37.3
Neutral Detergent Fiber, %	57.9	62.7
NDFD (digestibility) 48 hr, % of NDF		57
IVTDMD (in vitro true digestibility) 48 hr, %	65.0	70.4
ENERGIES		
TDN Est., %	55.4	60.0
Net Energy Lact, MCal/lb	0.5663	0.6136
Net Energy Maint, MCal/lb	0.5494	0.5952
Net Energy Gain, MCal/lb	0.3092	0.3350
QUALITY VALUE		
Relative Feed Value		89
Relative Forage Quality		119
MINERALS		
Calcium, % Ca	0.20	0.22
Phosphorus, % P	0.22	0.24

La Jara Triticale

- Last Trimester before calving
 - 2 lbs. CP and 12.5 lbs. TDN
 - Intake 24 lbs
 - 20.8 lbs to meet Energy
 - 20 lbs to meet CP
- Peak Lactation and Breeding
 - 3 lbs. CP and 16.7 lbs. TDN
 - Intake 27.8 lbs
 - 27.8 lbs to meet Energy
 - 30 lbs to meet CP
- **Always Check CA and P to 2:1**



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Description : MEADOW HAY

	Analysis As Received	Analysis Dry Basis
Moisture, %	10.27	0.00
Dry Matter, %	89.73	100.00
PROTEIN		
Crude Protein, %	7.8	8.6
FIBERS		
Acid Detergent Fiber, %	29.8	33.3
Neutral Detergent Fiber, %	47.3	52.7
NDFD (digestibility) 48 hr, % of NDF		53
IVTDMD (in vitro true digestibility) 48 hr, %	65.7	73.2
ENERGIES		
TDN Est., %	58.0	64.6
Net Energy Lact, MCal/lb	0.5969	0.6652
Net Energy Maint, MCal/lb	0.5960	0.6642
Net Energy Gain, MCal/lb	0.3566	0.3974
QUALITY VALUE		
Relative Feed Value		111
Relative Forage Quality		130
MINERALS		
*Calcium, % Ca	0.70	0.77
*Phosphorus, % P	0.15	0.17

La Jara Meadow Hay

- Last Trimester before calving
 - 2 lbs. CP and 12.5 lbs. TDN
 - Intake 24 lbs
 - 19.35 lbs to meet Energy
 - 23.25 lbs to meet CP
- Peak Lactation and Breeding
 - 3 lbs. CP and 16.7 lbs. TDN
 - Intake 27.8 lbs
 - 25.85 lbs to meet Energy
 - 34.9 lbs to meet CP
- **Always Check CA and P to 2:1**



Lab Test Results

Table 2. Equivalent levels of nitrate.					
Nitrate		Nitrate-nitrogen (NO ₃ -N)		Potassium nitrate (KNO ₃)	
ppm ₁	%	ppm	%	ppm	%
200	.02	46	.0046	326	.0326
5,000	0.5	1,150	.115	8,150	.815
10,000	1.0	2,300	.23	16,300	1.63

Nitrate = Potassium nitrate x 0.6 OR = Nitrate nitrogen x 4.4



Minerals and Vitamins

Subtitle goes here



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Vitamins

Fat Soluble

A, D, E & K

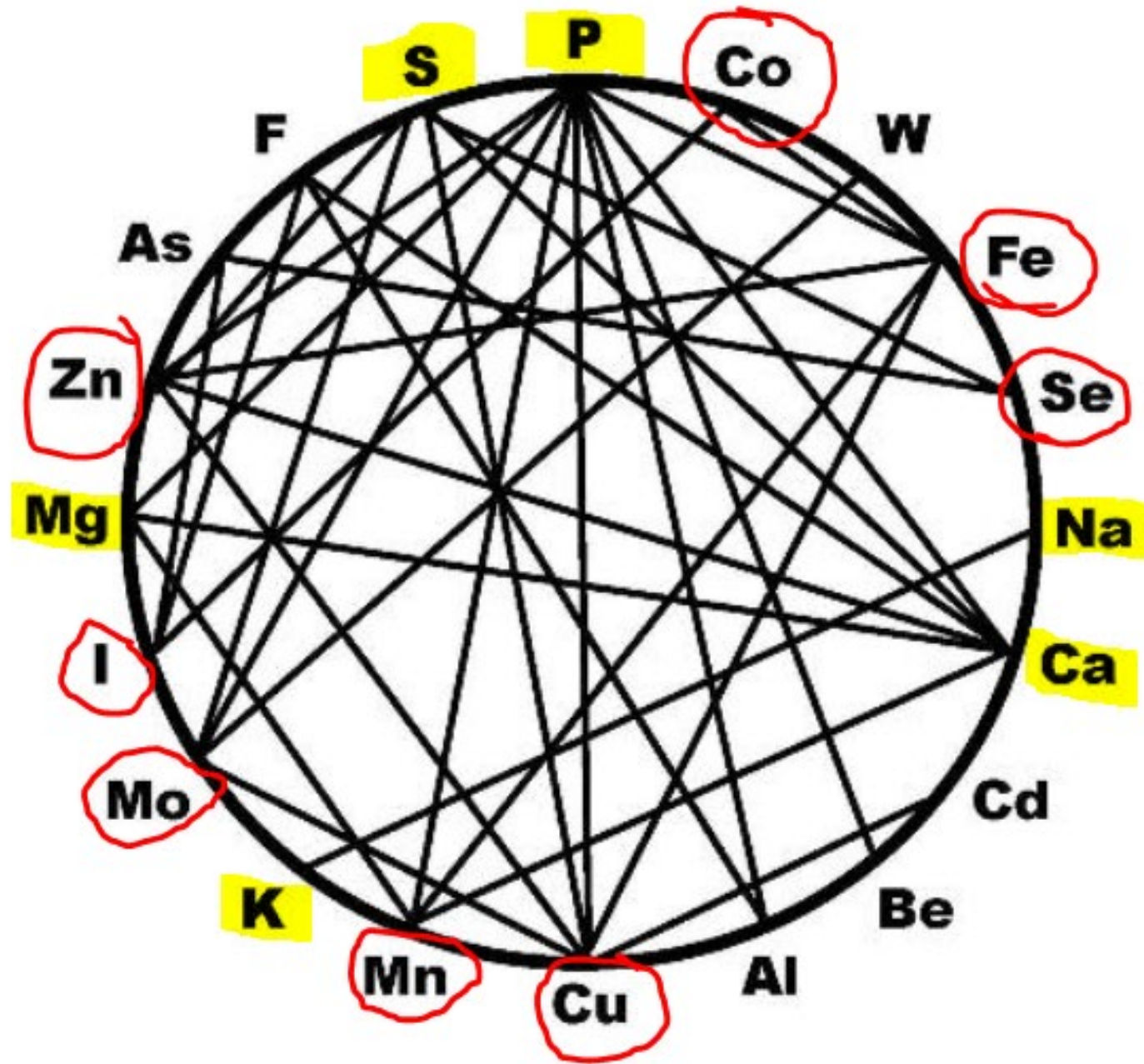
Stored by Animal

Water Soluble

Immunity



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Oxides < Sulfates < Chelated

Macro Minerals in g/day

Micro Minerals in ppm or mg

Fine Line

\$ for Performance

\$ in excess waste



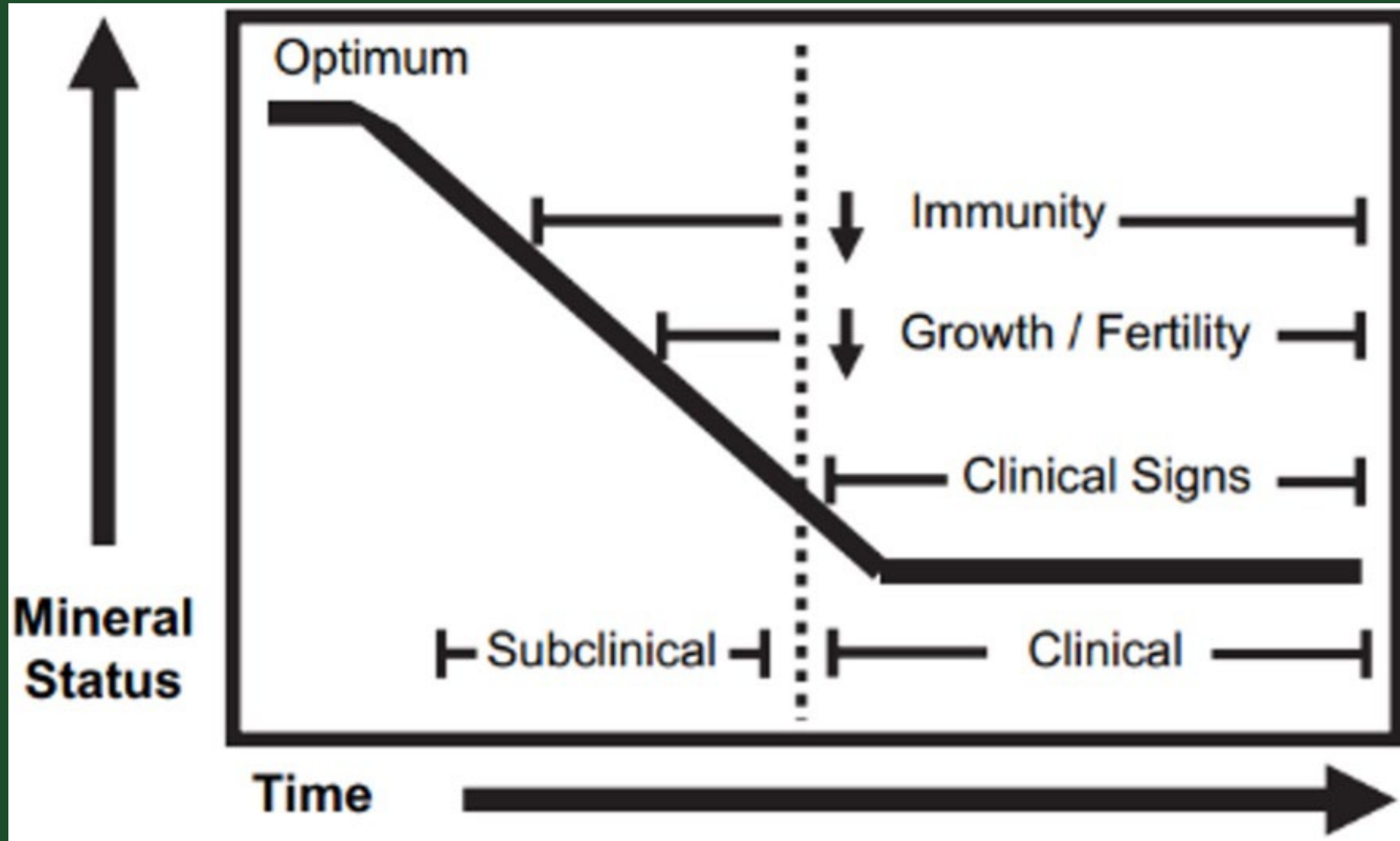




Fig 2: Muscle weakness in a recently calved beef cow with early hypocalcaemia

Milk Fever

Inability to mobilize and absorb Calcium

Raise Ca and P in diet

To high of Ca in the diet is a problem

Adequate Vitamin D supplement

[Veterinary Medicine/Diseases of Cattle
ptSsdreono80 6hia042124h31p418itul42 Ah5ul6
00rf0i49,itlmu75t](#)



White Muscle Disease

Interaction with Se and Vitamin E

Low soil Se

Two types

Cardiac

Skeletal

Supplement Free Choice

Injectable

Goats require a higher level

Image source: North Carolina State University



Polioencephalomalacia

Thiamine (B1) disturbance

Concentrate:Roughage

Kochia

high sulfates in diet

Is correctable and avoidable

Photo: Michigan State University



Urinary Calculi

High Phosphorus Rations

Silicate Calculi on Range

Water levels

Lower P

Correct Ca:P

Ammonium Chloride

Photo: © *Onion Creek Ranch*
www.tennesseemeatgoats.com

Other Concerns

- High Mo ties up CU
- Ca and Mg levels
- Zn, Fe, Co and Cu

How You Supplement

- Free choice
- Injectable
- Drench
- Mix with Salt

When you Supplement

- Before Diet Changes





Questions



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Thank you



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