TEXAS A&M AGRILIFE EXTENSION

Nutrition Basics for Cow-Calf Operations

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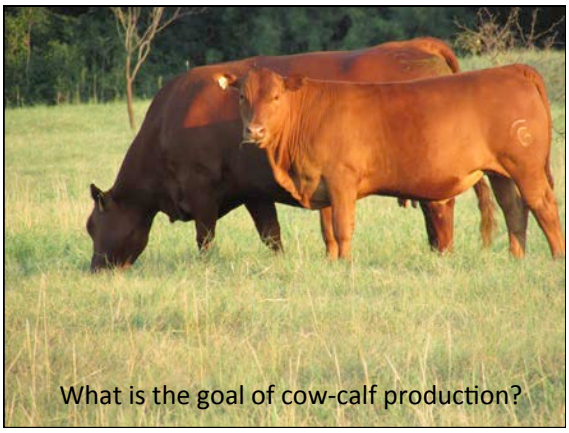
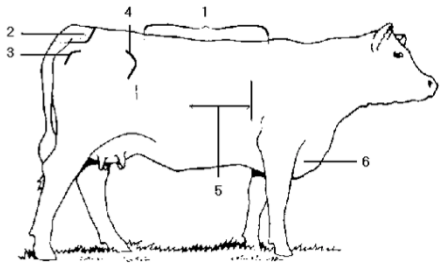


How can we monitor cow nutrition and performance?

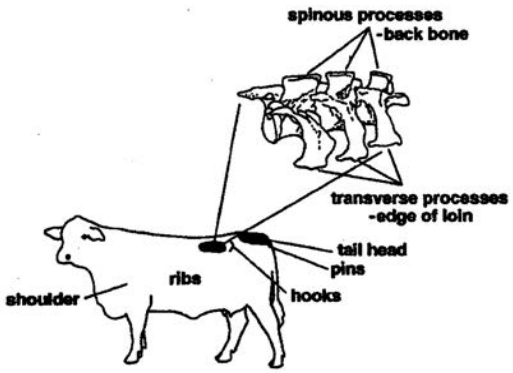
Performance Terminology

Growing Cattle: ADG Cows: BCS

Areas to evaluate Body Condition



1. BACK
2. TAIL HEAD
3. PINS
4. HOOKS
5. RIBS
6. BRISKET



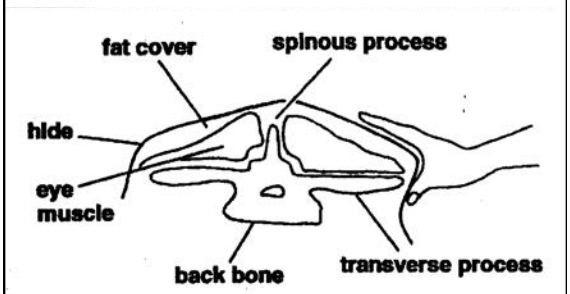


Figure 1. Anatomic areas that are used for scoring body condition in beef cows.

Visible	Visible	Visible	No fat	No fat	None
Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling

Visible	Visible	Visible	No fat	No fat	None
Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling

Foreribs visible	Slightly visible	Visible	No fat	No fat	Some
Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling

Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling
Foreribs visible	Slightly visible	Visible	No fat	No fat	Some

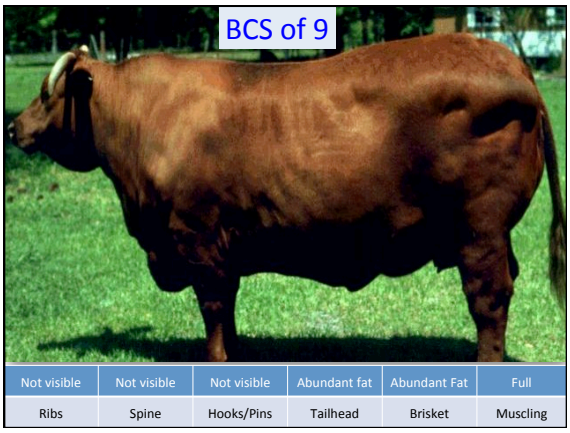
Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling
1 or 2 may be visible	Not visible	Visible	No fat	No fat	Full

Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling
1 or 2 may be visible	Not visible	Visible	No fat	No fat	Full

Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling
Not visible	Not visible	Visible	Some fat	Some fat	Full

Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling
Not visible	Not visible	Slightly visible	Some fat	Fat	Full

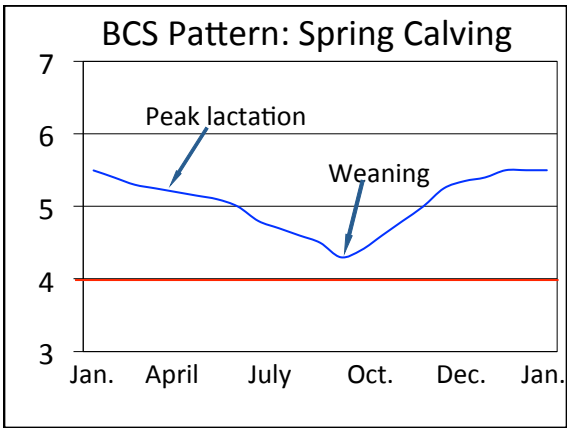
Ribs	Spine	Hooks/Pins	Tailhead	Brisket	Muscling
Not visible	Not visible	Not visible	Abundant fat	Abundant Fat	Full



When should you take BCS?

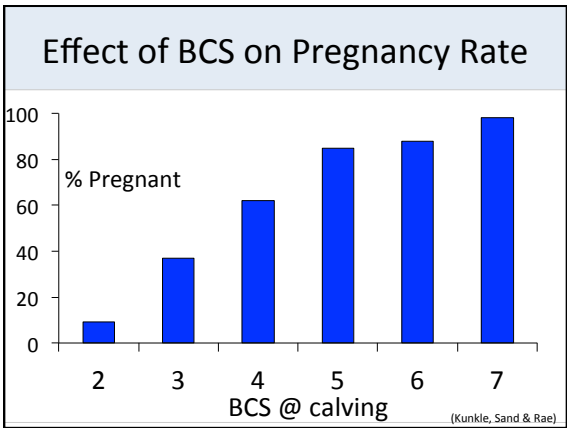
- at weaning
  - most important time
- every few months

- score the same cows in the herd
- a digital camera can be a good tool



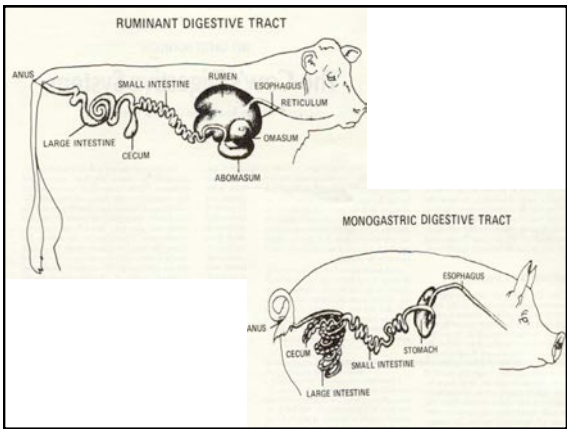
Practice Time

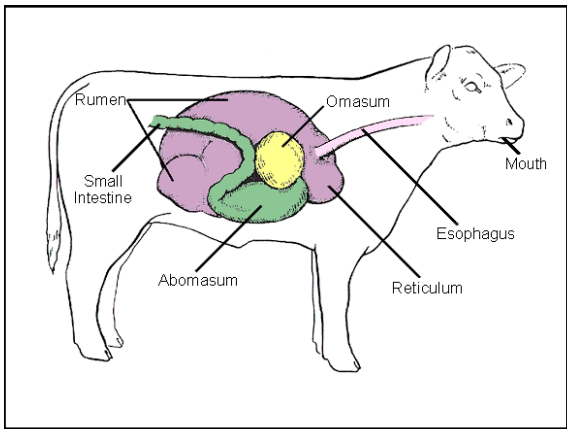
Nutrition and Reproduction: Mature Cows



Nutrition Basics

What is the key component of a cow's diet?





Can cow's eat things other than forage?

Acidosis

pH 0	Battery Acid
pH 1	Stomach Acid
pH 2	Lemon Juice, Vinegar
pH 3	Orange Juice, Soda, Some Dental Rinses
pH 4	Tomato Juice, Beer
pH 5	Black Coffee
pH 6	Saliva, Cow's Milk
pH 7	Pure Water
pH 8	Sea Water, pH-Neutralizing Dental Rinses
pH 9	Baking Soda
pH 10	Antacids
pH 11	Antacids, Dental Treatment Rinses
pH 12	Soapy Water

(photo courtesy of vetnext.com)

(photo courtesy of FiveF)

What do we need if cattle are grazing high quality forage?

What do we need if cattle are consuming low quality forage?

Supplementation Basics

When do we supplement?

for most beef cow-calf operations protein and/ or energy supplementation is generally needed

- late summer when forage quality declines
- during the winter

protein and energy supplementation is not needed

- year round
- 24/7

Forage Quality and Forage Intake

as forage quality declines forage intake decreases

- low quality forage = low intake
- high quality forage = higher intake

Determining Forage Quality

sample each cutting

TDN (i.e. energy)

- summative equations
- NDF, ash, CP
- NDF digestibility
- cattle, horses, etc.

Crude Protein

approx. cost $50

Forage Testing Laboratories

Dairy One Forage Lab
Ithaca, NY; 800-344-2697
http://www.dairyone.com

Servi-Tech Laboratories
Amarillo, TX; Dodge City, KS; Hastings, NE
800-557-7509
http://www.servitechlabs.com

- wet chemistry will always work
- NIR can be used if lab has forage specific database

Components	As Fed	DM
% Moisture	8.0	
% Dry Matter	92.0	
% Crude Protein	11.3	12.2
% Adjusted Crude Protein	11.3	12.2
% Acid Detergent Fiber	37.3	40.6
% Neutral Detergent Fiber	64.8	70.5
% NFC	11.6	12.6
% TDN	50	54
NEL, Mcal/Lb	.38	.41
NEM, Mcal/Lb	.42	.46
NEG, Mcal/Lb	.19	.21

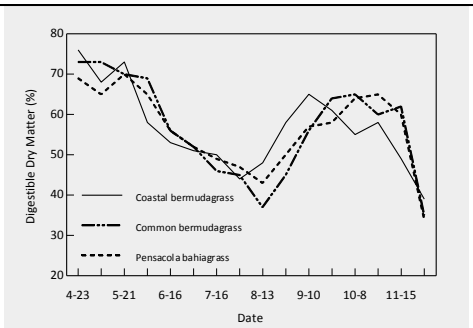
Determining Forage Quality

Pasture:

forage species

growing conditions

fecal consistency



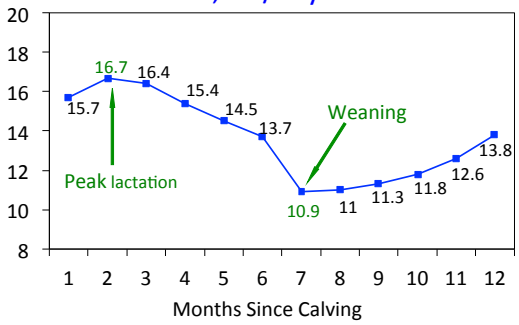
Time of year influences the quality of warm-season perennial grasses.

(Duble, 1970; pasture samples taken at Overton)

Nutrient Requirements

Requirements of a 1200 lb Mature Cow

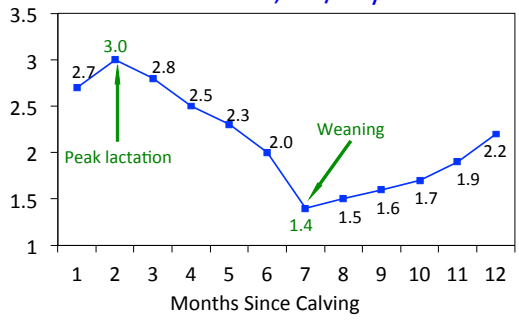
TDN, lbs/day



(NRC, 1996; Appendix Tables 21-23)

Requirements of a 1200 lb Mature Cow

Crude Protein, lbs/day



(NRC, 1996; Appendix Tables 21-23)

The Simple Way

Cow Stage of Production*	CP, % of DM	TDN, % of DM
2-yr-old lactating cow**	11	62
3-yr-old lactating cow**	11.5	63
mature lactating cow**	11.5	63

*Estimated dietary requirements to maintain cow body condition for Brahman influenced cows under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including animal weight, body condition, breed, environmental factors, and others.
**Requirements for lactating cows are at peak lactation.

Cow Stage of Production*	CP, % of DM	TDN, % of DM
2-yr-old lactating cow**	11	62
3-yr-old lactating cow**	11.5	63
mature lactating cow**	11.5	63
3-yr-old dry cow, 270 d pregnant	9	58
mature dry cow, 270 d pregnant	8	55
mature dry cow, 180 d pregnant	7	49

*Estimated dietary requirements to maintain cow body condition for Brahman influenced cows under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including animal weight, body condition, breed, environmental factors, and others.
**Requirements for lactating cows are at peak lactation.

A Simpler Way,

but….what if the cows look like this?

What type of supplement is needed?

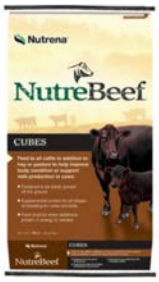
protein energy

a combination of energy and protein

Prices quoted on: 3-17-14

Ingredient	$/50 lb	$/ton	% TDN, DMB	% CP, DMB
12% cube	$8.50	$340	81	13.6
20% cube	$9.95	$398	65	22.7
20% cube, breeder	$10.30	$412	77	22.7
40% cube	$13.55	$542	75	43.2

20% cubes



vs

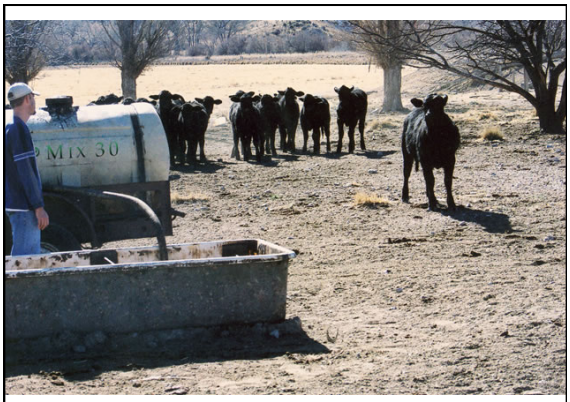
20% tub

$10.60/50 lb sack
$424/ton

$98.95/225 lb tub
$880/ton

Generally, on all FS protein supplements one tub to 25 head will achieve a .5 to .75 of a pound per-head per-day consumption, which is all that cattle need.

???



Determine which supplement is the best buy for the needed nutrients

Need Protein

20% CP cube (all natural)
- $10.30 per 50 lb sack
- 10 lb CP per sack (50 x 0.20 = 10 lb of CP)
- $1.03/lb of CP ($10.30 ÷ 10 = $1.03/lb)

38 % CP cube
- $13.55 per 50 lb sack
- 19 lb CP per sack (50 x 0.38 = 19 lb of CP)
- $0.71/lb of CP ($13.55 ÷ 19 = $0.71/lb)

Need Energy

20% CP cube (high energy, 70% TDN, AFB)
- $10.30 per sack
- 35 lb of TDN per sack (50 x 0.70 = 35 lb)
- $0.29/lb of TDN ($10.30 ÷ 35 = $0.294/lb)

38% CP cube (67 % TDN, AFB)
- $13.55 per 50 lb sack
- 33.5 lb TDN per sack (50 x 0.67 = 33.5 lb)
- $0.40/lb of TDN ($13.55 ÷ 33.5 = $0.404/lb)

Monitor and adjust your supplementation program as performance dictates

Supplementation Frequency

Frequency of Supplementation

protein supplements
(no NPN or antibiotics)
- everyday
- 3 times/wk
- 2 times/wk
- 1 time/wk ??

- everyday
  - 2 lbs
- 3 times/wk
  - 4.7 lbs
- 2 times/wk
  - 7 lbs
- 1 time/wk ??
  - 14 lbs

Frequency of Supplementation

energy supplements
- best to feed everyday
- if feeding small amounts, can feed every other day
- feeding at less frequent intervals can lead to big problems

feeding 3 times a week reduced ADG by 10% compared with daily feeding (Loy et al., 2008)
- 3 supplements, 2 supplementation levels

TEXAS A&M AGRILIFE EXTENSION

Cow-Calf Mineral and Vitamin Supplementation

Jason Banta, Ph.D., PAS
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Overton, TX

mineral nutrition impacts
- growth
- reproduction
- milk production
- health

PROFITABILITY

Components of a Complete Mineral Supplement

- salt
- macro minerals
- trace minerals (aka micro minerals)
- vitamins A, D, and E

Macro	Trace (micro)
% of diet	ppm or mg/kg
calcium	copper
phosphorus	manganese
magnesium	zinc
potassium	cobalt
sodium	selenium
sulfur	iodine
	iron
	others

Common Formulations

- high-calcium, lower phosphorus
- 12:12
- winter pasture (higher Mg)

Differences Between Companies

- formulation
- mineral source
- reputation
- palatability enhancers
- targeted intake
- weatherization

Cow-Calf Examples
Loose Minerals

3 basic formulas, common in Texas

- Texas All Season 7.5 Complete
- Texas All Season 12 Complete
- Hi-Magnesium Complete

The Copper Race

Copper sulfate	100%
Copper carbonate	120%
Copper proteinate	105%
Copper oxide	30%
Zinc sulfate	100%
Zinc oxide	95%
Zinc proteinate	130%

Mineral Formulation

- Cu – Zn – Mn
  - requirement: 10-30-40
  - formulate mineral: 1-4-2

Tubs

Crystalyx

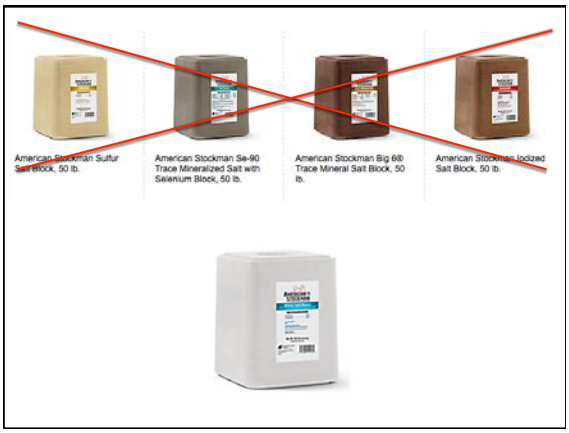
Mineral		
BREED UP MAX	MORE>>	4 oz
Crystal-Phos	MORE>>	4 oz
DISTILLERS OPTIMIZER	MORE>>	4 oz
Fescue-Phos	MORE>>	4 – 6 oz
IGR MAX	MORE>>	4 oz
Mineral-lyx	MORE>>	4.8 - 12 oz
Phos-lyx	MORE>>	4 oz
ROL YX MAX	MORE>>	
SUPER MAG	MORE>>	4 – 17.6 oz

Thoughts

- need separate source of salt
- questionable formulations
- large pastures, grazing management

Blocks

	Big 6	Se-90	Iodized	Sulfur
Calcium				
Phosphorus				
Salt	96 - 99	95 – 98.5	97 – 99.7	95 - 97
Magnesium				
Potassium				
Sulfur				3
Copper	260 - 380	280 - 420		
Manganese	2,400	1,800		
Zinc	320	3,500		
Selenium		90		
Iodine	70	100	100	
Cobalt	40	60		
Vitamin A				
Vitamin D				
Vitamin E				



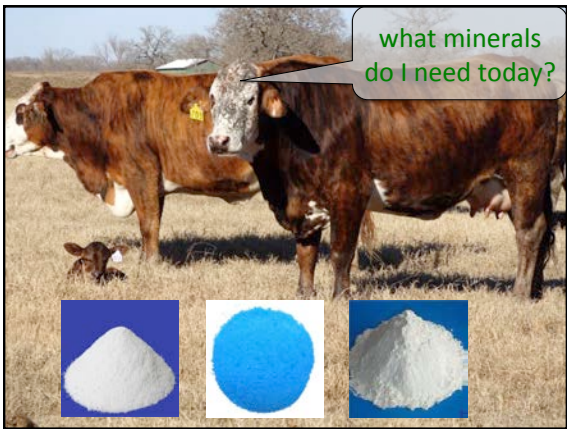
Don't Make Sense To Me

GUARANTEE	LEVEL	
Calcium, (Ca) min/max %	0.0	Calcium Carbonate
Phosphorus, (P), min %	7.0	All from Tech Grade Monosodium Phosphate (26% Phosphorus, 0% Calcium and <50 ppm iron
Salt, (NaCl) min/max %	35.2-40.2	
Sodium, (Na) min/max %	22.5-26.9	from Sodium Bicarbonate, MSP and Salt
Magnesium, (Mg) min %	2.0	Magnesium Sulfate and Oxide
Potassium, (K) min %	3.0	Potassium Chloride
Sulfur, (S) min %	4.7	from Elemental Sulfur and sulfates (trace minerals)
Iron, (Fe) min ppm	0	no Iron (Fe) added (any levels incidental)
Cobalt, (Co) min ppm	50	Cobalt Carbonate
Copper, (Cu) min ppm	3000	Copper Sulfate
Iodine, (I) min ppm	800	EDDI (organic)
Manganese, (Mn) min ppm	2500	Manganese Sulfate
Selenium, (Se) min ppm	50	Sodium Selenite
Zinc, (Zn) min ppm	3800	Zinc Sulfate
Vitamin A, min IU per lb	200,000	
Vitamin D3 min IU per lb	20,000	
Vitamin E, min IU per lb	200	

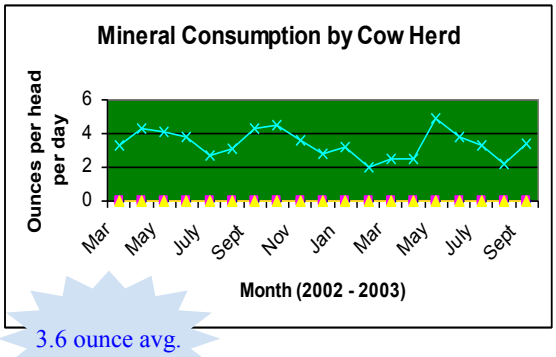
Ingredients: Salt, Monosodium Phosphate, Sodium Bicarbonate, Potassium Chloride, Sulfur, Magnesium Oxide, Magnesium Sulfate, Zinc Sulfate, Manganese Sulfate, Copper Sulfate, EDDI, Cobalt Carbonate, Sodium Selenite, Vit. A Supplement, Vit. D3 Supplement, Vit. E Supplement.

Mineral Feeders

Mineral Intake



- 2 or 4 oz average consumption
- intake varies over time
- lactation may increase intake, 2 to 2.5x



3.6 ounce avg.

(Mason, 2005)

- if intake is to high
  - provide free choice salt
  - check location of mineral feeder
  - reduce amount of mineral fed
- if intake is low
  - determine if cattle are receiving salt from another source
  - check location of mineral feeder

Calculating Mineral Intake

- 35 cows
- put 50 lbs of mineral in an empty feeder
- mineral lasts for 6 days
- 50 lbs ÷ 6 days = 8.33 lbs per day for the herd
- 8.33 lbs per day ÷ 35 hd = 0.24 lbs/hd/d
- 16 oz x 0.24 lbs = 3.8 oz/hd/d

When and What Do I Feed

Reputable Company with a Nutritionist on Staff

When should I feed a cow-calf mineral?

- ideally year round
- last 3, first 3

Mineral Supplementation: Cows

fertilized pasture or hay
- complete high Ca low P mineral (2.5:1 or 3:1)

cows on winter pasture
- complete high Ca low P mineral
- with moderate Mg level

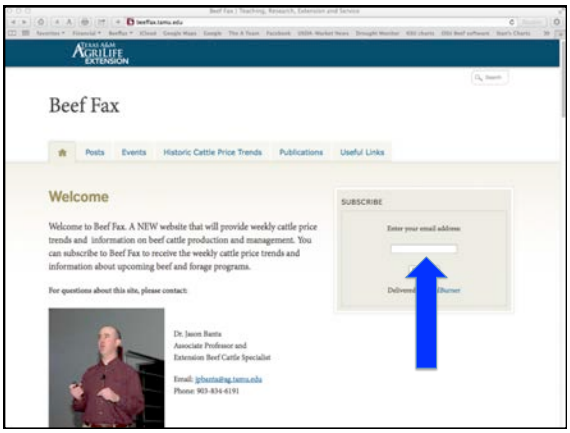
provide vitamin A during drought

and winter if not grazing winter annuals

What do I look for in a good 4 oz mineral for cows?

- proper intake
- about:
  - 15-18% Ca
  - 3-6% P
  - 1,500 ppm Cu
  - 6,000 ppm Zn
  - 15-20% salt

- Texas All Season 7.5 Complete
- Hi-Magnesium Complete



http://beef.tamu.edu