



Supplementation Basics for Cow-Calf Operations

Jason Banta, Ph.D., PAS
Associate Professor and Extension Beef Cattle Specialist
Texas A&M AgriLife Extension Service
Texas A&M University
Overton, TX

Hay Feeding Scenarios

- ~~cheap and easy~~
- easiest and least expensive
- frequent labor when needed, less expensive
- less consistent labor, more expensive

What 3 primary things affect supplementation of energy & protein?

BCS
forage & hay quality
nutrient requirements

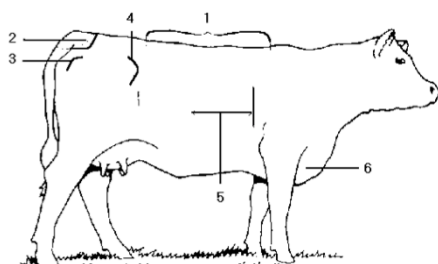
Performance Terminology

Growing Cattle: ADG

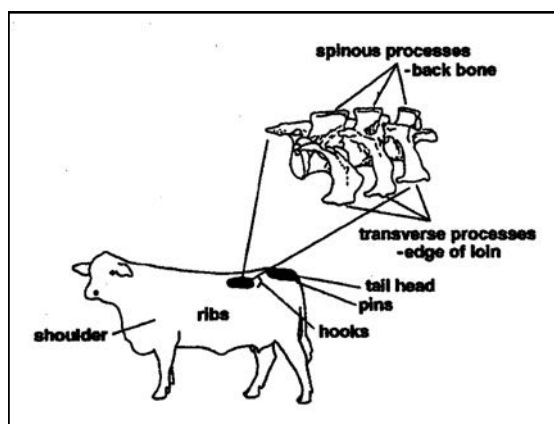
Cows: BCS

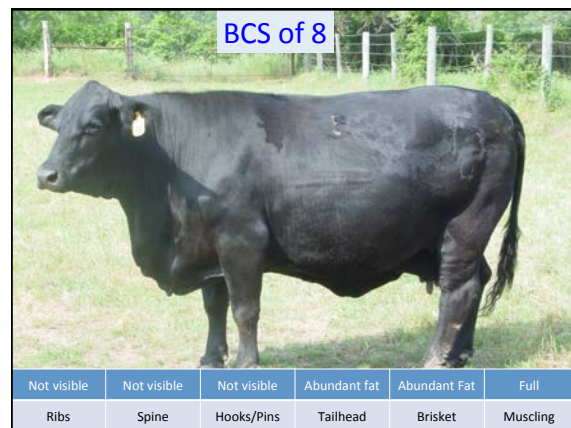
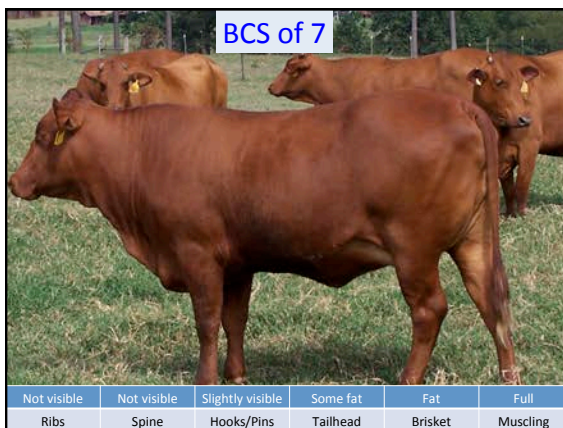
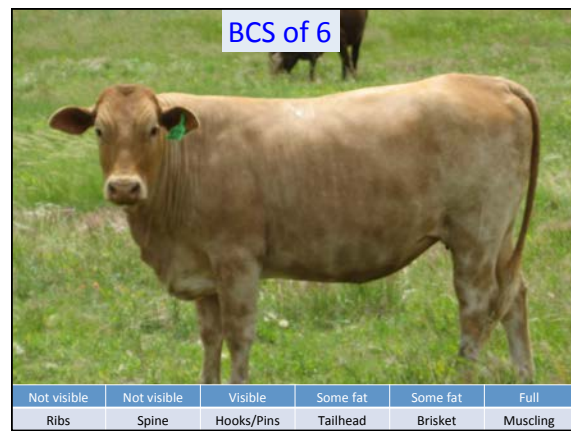
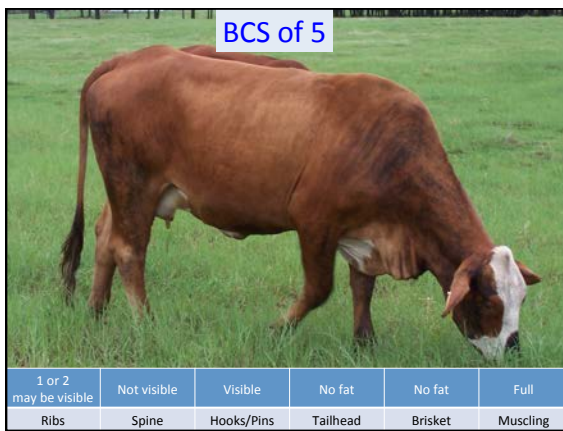
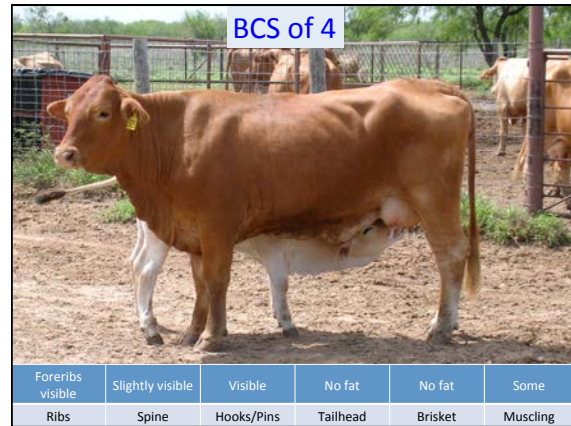
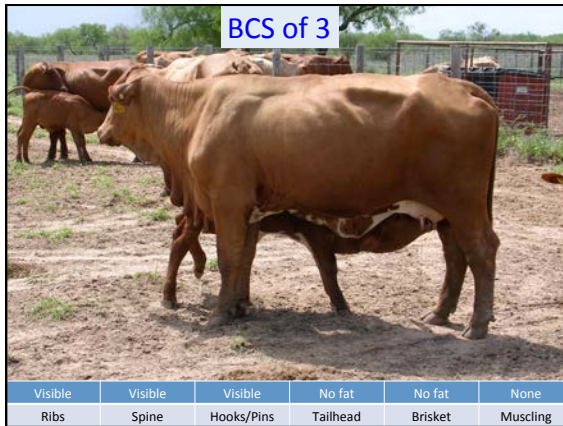


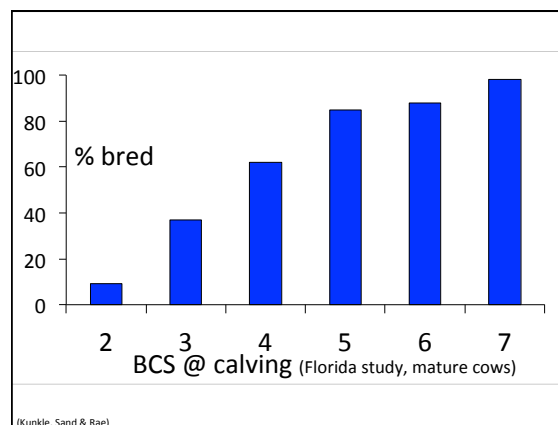
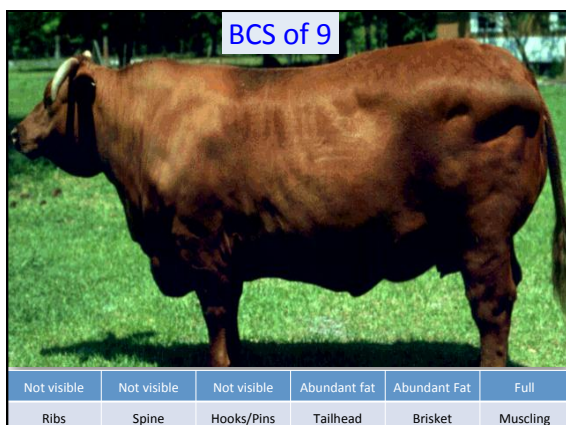
Areas to evaluate Body Condition



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







Forage Quality and Forage Intake

as forage quality declines forage intake decreases

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



Factors Affecting Forage Quality

- maturity
- species
- temperature
- rained on hay

Maturity

| Interval between cuttings | % TDN | Yield, tons/acre |
|---------------------------|-------|------------------|
| 3 weeks | 65.2 | 7.9 |
| 4 weeks | 61.9 | 8.4 |
| 5 weeks | 59.3 | 9.2 |
| 6 weeks | 58.0 | 10.3 |
| 8 weeks | 54.1 | 10.2 |
| 12 weeks | 51.0 | 10.4 |

- Coastal bermudagrass study in Georgia
- Glen Burton

Species

hybrid bermudagrass versus:

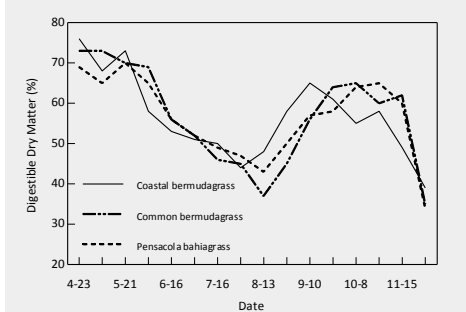
- Tifton 85
- bahiagrass
- crabgrass
- johnsongrass
- native range
- winter annuals (i.e. ryegrass, rye, oats, etc.)

Species

cool season > warm season

annuals > perennials

- ↓
- winter annuals (i.e. ryegrass, rye, oats, etc.)
 - Tifton 85
 - crabgrass
 - johnsongrass
 - bahiagrass
 - bermudagrass



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

(Duble, 1970; pasture samples taken at Overton)



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



| Components | As Fed | DM |
|---------------------------|--------|-----------|
| % Moisture | 9.1 | |
| % Dry Matter | 90.9 | |
| % Crude Protein | 6.2 | 6.8 |
| % Adjusted Crude Protein | 6.2 | 6.8 |
| % Acid Detergent Fiber | 45.3 | 49.8 |
| % Neutral Detergent Fiber | 56.1 | 61.8 |
| % NFC | 22.3 | 24.5 |
| % TDN | 52 | 57 |
| NEL, Mcal/Lb | .46 | .51 |
| NEM, Mcal/Lb | .46 | .51 |
| NEG, Mcal/Lb | | .26 |
| IVTD 48hr, % of DM | | 69 |
| NDFD 48hr, % of NDF | | 50 |

57% TDN

| Components | As Fed | DM |
|---------------------------|--------|-------|
| * Moisture | | |
| * Dry Matter | | |
| * Crude Protein | 6.2 | 6.8 |
| * Adjusted Crude Protein | 6.2 | 6.8 |
| * Acid Detergent Fiber | 45.3 | 49.8 |
| * Neutral Detergent Fiber | 56.1 | 61.8 |
| * NFC | 11.8 | 13.0 |
| * Ash | 16.55 | 18.21 |
| * TDN | 42 | 46 |
| NEL, Mcal/Lb | .37 | .41 |
| NEM, Mcal/Lb | .31 | .34 |
| NEG, Mcal/Lb | .0 | .09 |
| IVTD 48hr, % of DM | | 69 |
| NDFD 48hr, % of NDF | | 50 |

18.21% Ash

46% TDN

Forage Testing Laboratories

Dairy One Forage Lab

Ithaca, NY; 800-344-2697

<http://www.dairyone.com>

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

Determining Forage Quality

Pasture:

forage species
growing conditions
fecal consistency



Nutrient Requirements

| 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.

| 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, 25 lbs of milk | 11.5 | 63 |
| mature lactating cow, 15 lbs of milk | 10 | 60 |
| 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.



but....what if the cows
look like this?



| 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 |

Hay Feeding Scenarios

~~cheap and easy~~

- easiest and least expensive
- less consistent labor, more expensive
- frequent labor when needed, less expensive

Easiest,
Least Expensive



Frequent Labor When Needed,
Less Expensive

What type of supplement is needed?

protein energy
a combination of energy and protein

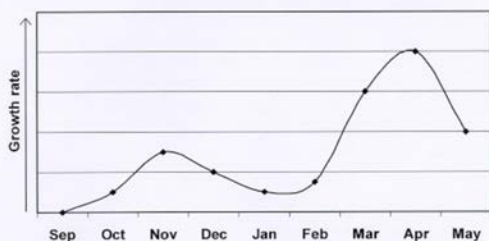


Prices quoted on: 9-9-15

| Ingredient | \$/50 lb | \$/ton | % TDN, DMB | % CP, DMB |
|----------------------|----------|--------|---------------|--------------|
| 12% cube | \$7.10 | \$284 | 81 | 13.6 |
| 20% cube | \$7.80 | \$312 | 65 | 22.7 |
| 20% cube, breeder | \$8.60 | \$344 | 77 | 22.7 |
| 38% cube | \$10.60 | \$424 | 75 | 43.2 |



**Utilizing Cool-Season
Annual Grasses
(ryegrass, small grain-ryegrass mixtures)**



Energy Sources

- 12-14% cubes
- corn
- soybean hulls
- wheat midds
- rice bran



gradually increase levels in the diet

Energy and Protein Sources

- 20% cubes "breeder"
- 20% cubes
- corn gluten feed
- distillers grains
- winter pasture
- whole cottonseed
(max. 25% of diet)



gradually increase levels in the diet

Protein Sources

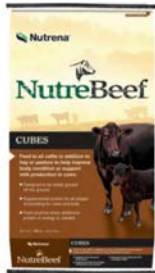
- 40% cubes
- cottonseed meal
- soybean meal
- sunflower meal
- alfalfa hay
- winter pasture



Less Consistent Labor,
More Expensive



20% cubes



\$10.60/50 lb sack
\$424/ton

VS

20% tub



\$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.

???



Nutrient Intake

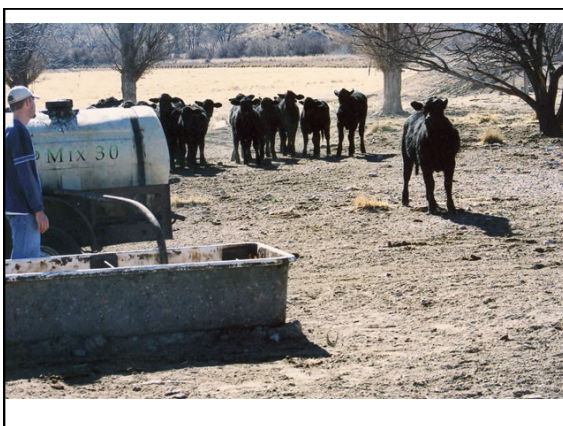
32% CP liquid (45% TDN, _{AFB})

- intake: 2 lbs
- TDN intake: 0.9 lbs
- CP intake: 0.64 lbs

38% CP cube (67 % TDN, _{AFB})

- intake: 2 lbs
- TDN intake: 1.34 lbs
- CP intake: 0.76 lbs

Can Provide More Energy



Starting Point

Hay: 45% TDN, 5.0% CP

Dry cow

goal: maintain BCS

8 lbs of 20% cubes

Wet Cow

goal: control weight loss

11 lbs of 20 % cubes

Hay: 50% TDN, 6.5% CP

Dry cow

goal: maintain BCS

4 lbs of 20% cubes

Wet Cow

goal: control weight loss

6 lbs of 40 % cubes

Hay: 55% TDN, 9.0% CP

Dry cow

goal: maintain BCS

hay only

Wet Cow

goal: control weight loss

2 lbs of 40 % cubes

Monitor and adjust your supplementation
program as performance dictates



Red Flags

| | |
|-------------------------------|-----------|
| Lab number: | F20881 |
| Sample Material | COASTAL |
| Sample ID | 2 450 2ND |
| Moisture % (as received) | 10.0 |
| Crude Protein % | 13.4 |
| NDF % ^{1/} | 63.0 |
| ADF % ^{2/} | 37.9 |
| IVTD % ^{3/} | 57.5 |
| Estimated TDN % ^{4/} | 66.8 |
| RFV % ^{5/} | 87.7 |

^{1/}NDF (Neutral Detergent Fiber) is a measure of fiber content which is related to forage intake. Average NDF values are around 65%. Lower values indicate greater forage intake.

^{2/}ADF (Acid Detergent Fiber) is a measure of fiber content and therefore reflects plant maturity. Average ADF values are about 40%. Lower values indicate greater digestibility.

^{3/}IVTD (in vitro True Digestibility) is a measure of digestibility in rumen fluid. Average IVTD is about 60%. Higher values indicate greater digestibility.

^{4/}TDN is estimated with a formula that includes both crude protein and ADF.

^{5/}RFV (Relative Feed Value) is a comparison with alfalfa hay at 100%. The alfalfa is 3/4 bloom and about 16% protein.

| | |
|--|--------------------|
| Forage quality: MEDIUM | lbs/day, estimated |
| Average Daily Gain for a 500 lb yearling : | 1.00 |
| Daily intake of forage: | 11 |
| Average Daily Gain for a 1000 lb dry cow : | 1.32 |
| Daily intake of forage: | 24.5 |

This is with supplemental feeding.

Pricing Supplements

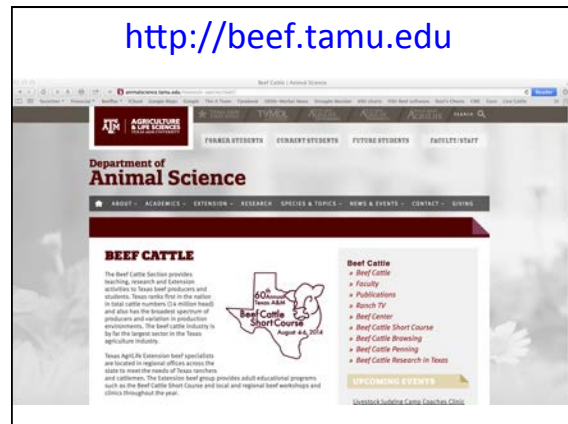
Frequency of Supplementation

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





Cow-Calf Mineral and Vitamin Supplementation

Jason Banta, Ph.D., PAS
Associate Professor and Extension Beef Cattle Specialist
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 |
| <ul style="list-style-type: none"> • calcium • phosphorus • magnesium • potassium • sodium • sulfur | <ul style="list-style-type: none"> • copper • manganese • zinc • cobalt • selenium • 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

Purina



3 basic formulas,
common in Texas

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

| | Texas All Season 7.5 Complete | Texas All Season 12 Complete | Hi-Magnesium Complete |
|------------|-------------------------------|------------------------------|-----------------------|
| Calcium | 14 - 16 | 12.5 - 14.5 | 13 - 15 |
| Phosphorus | 7.5 | 12 | 4 |
| Salt | 19 - 21 | 23 - 25 | 16.5 - 18.5 |
| Magnesium | 1 | 1 | 10 |
| Potassium | 1 | 1 | 0.1 |
| Copper | 2,500 | 2,500 | 1,200 |
| Manganese | 4,000 | 4,000 | 3,600 |
| Zinc | 7,500 | 7,500 | 3,600 |
| Selenium | 27 | 27 | 27 |
| Iodine | 60 | 60 | 60 |
| Cobalt | 12 | 12 | 12 |
| Vitamin A | 150,000 | 150,000 | 75,000 |
| Vitamin D | 15,000 | 15,000 | 7,500 |
| Vitamin E | 150 | 150 | 75 |

Cargill



| | Emerald | Bronze | Gold |
|------------|----------------|---------------|-------------|
| Calcium | 15.5 – 16.5 | 11.5 – 13.5 | 12 - 13 |
| Phosphorus | 5 | 8 | 2 |
| Salt | 15 - 16 | 15 - 17 | 13 - 15 |
| Magnesium | 5 | 3 | 13 |
| Potassium | 0.1 | 2 | 0.2 |
| Copper | 2,500 | 2,500 | 1,500 |
| Manganese | 4,000 | 4,000 | 4,000 |
| Zinc | 4,500 | 6,000 | 4,500 |
| Selenium | 26 | 26 | 26 |
| Iodine | 200 | 200 | 200 |
| Cobalt | 20 | 20 | 20 |
| Vitamin A | 100,000 | 100,000 | 100,000 |
| Vitamin D | - | 10,000 | - |
| Vitamin E | 100 | 110 | 100 |

Options

Additives

researched

- IGR
- CTC
- bovatec
- rumensin

- bovatec is not labeled for cows



3 basic formulas,
common in Texas

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

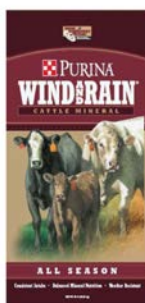
PURINA WIND & RAIN® TEXAS ALL SEASON 7.5 COMPLETE 0040260

What It Is...

A comprehensive line of beef cattle minerals designed to correct the mineral deficiencies of the available forage in a palatable, weather-resistant, loose formula. Wind and Rain® cattle minerals' large particle size and special formulation keeps the mineral from blowing out of the feeder. And, since the moisture from rain or snow passes easily through the mineral, cattle continue to consume it even after it has been wet. This reduces waste and, as a result, makes Wind and Rain® more economical to feed than conventional loose minerals.

Available As:

| JDE Code No. | Mineral Name | Active Ingredient | Level |
|--------------|--|--------------------|--------------------------|
| 0040260 | Wind & Rain TX AS 7.5 CP | Non-Medicated | none |
| 0040261 | Wind & Rain TX AS 7.5 CP AU 2800 | Aureomycin | 2800 g/ton |
| 0040319 | Wind & Rain TX AS 7.5 CP AU 5600 | Aureomycin | 5600 g/ton |
| 0040262 | Wind & Rain TX AS 7.5 CP AU 2800 Altosid | Aureomycin Altosid | 2800 g/ton 95.2 g/ton |
| 0040320 | Wind & Rain TX AS 7.5 CP AU 5600 Altosid | Aureomycin Altosid | 5600 g/ton 95.2 g/ton |



Additives

researched

- IGR
- CTC
- bovatec
- rumensin

not well researched

Trace Mineral Considerations

Micro ("Trace") Minerals

- copper
- manganese
- zinc
- cobalt
- selenium
- iodine
- iron
 - *not usually supplemented*

Trace Minerals: The Silver Bullet Right?





Which mineral(s) affect reproduction of female cattle?

- a) copper
- b) zinc
- c) manganese
- d) copper and zinc
- e) zinc and manganese ←
- f) copper and manganese
- g) all three



Which mineral(s) affect reproduction of bulls?

- a) copper
- b) zinc ←
- c) manganese
- d) copper and zinc
- e) zinc and manganese
- f) copper and manganese
- g) all three



Copper

- female: no effect
- male: probably no effect

Zinc

- female: very little data in cattle, but important in ovarian remodeling and CL production
- male: impacts testicular growth

Manganese

- female: possible estrous effect
- male: no claims

The Copper Race

Inorganic
vs.
Organic/Chelated

forms of inorganic

oxides
sulfates
carbonates

| | |
|-------------------|------|
| Copper sulfate | 100% |
| Copper carbonate | 120% |
| Copper proteinate | 105% |
| Copper oxide | 30% |

| | |
|-----------------|------|
| Zinc sulfate | 100% |
| Zinc oxide | 95% |
| Zinc proteinate | 130% |

Organic/Chelated Minerals

- copper
- manganese
- zinc
- cobalt



PURINA® WIND AND RAIN® STORM® ALL SEASON 7.5 AVAILA® 4 COMPLETE

INGREDIENTS:

Dicalcium Phosphate, Monocalcium Phosphate, Calcium Carbonate, Salt, Processed Grain By-Products, Vegetable Fat, Mineral Oil, Magnesium Oxide, Iron Oxide, Vitamin E Supplement, Vitamin A Supplement, Silica Dioxide, **Zinc Amino Acid Complex**, **Manganese Amino Acid Complex**, **Copper Amino Acid Complex**, Ethylenediamine Dihydriodide, **Cobalt Glucoheptonate**, Vitamin D₃ Supplement, Natural and Artificial Flavors, Sodium Selenite.



Meets 100% of zinc, copper, manganese and cobalt trace mineral requirements using Zimpro® Availa® 4 complex trace minerals at a 4 ounce consumption rate.



Contains
chelated/
organic trace
minerals.

INGREDIENTS

Molasses products, monocalcium phosphate, dicalcium phosphate, magnesium oxide, dehydrated seaweed meal, hydrolyzed vegetable oil, calcium carbonate, **manganous oxide**, **manganese sulfate**, **manganese amino acid complex**, **zinc oxide**, **zinc sulfate**, **zinc amino acid complex**, **copper sulfate**, **copper chloride**, **copper amino acid complex**, ethylenediamine dihydriodide, calcium iodate, cobalt glucoheptonate, cobalt carbonate, sodium selenite, vitamin A acetate, vitamin D-3 supplement, vitamin E supplement, thiamine mononitrate, menadione sodium bisulfite complex, riboflavin supplement, calcium pantothenate, niacin supplement, vitamin B-12 supplement, choline chloride.

Organic/Chelated Minerals

- selenium



Tubs



Crystalux

| Mineral | | |
|----------------------------|--------|-------------|
| ➔ BREEDUP [®] 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 |

| | BreedUp Max | IGR Max | Mineral-lyx | Super Mag |
|---------------|-------------|---------|-------------|-----------|
| Crude Protein | - | - | 6 | 12 |
| Calcium | 6 - 7 | 5 - 6 | 3.5 - 4.5 | 1 - 1.5 |
| Phosphorus | 6 | 5 | 4 | 0.8 |
| Salt | none | none | none | none |
| Magnesium | 3.5 | 5.0 | 3.0 | 4.4 |
| Potassium | 1.7 | 1.5 | 1.7 | 2.0 |
| Copper | 2,000 | 1,000 | 500 | 330 |
| Manganese | 8,000 | 4,000 | 2,000 | 1,330 |
| Zinc | 6,000 | 3,000 | 1,500 | 1,000 |
| Selenium | 13.2 | 13.2 | 8.8 | 6.0 |
| Iodine | 100 | 50 | 25 | 17 |
| Cobalt | 65 | 10 | 5 | 3.3 |
| Vitamin A | 300,000 | 200,000 | 100,000 | 80,000 |
| Vitamin D | 30,000 | 20,000 | 10,000 | 8,000 |
| Vitamin E | 1,000 | 200 | 100 | 100 |

Thoughts

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



Blocks

American Stockman



| | 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 | | | | |

American Stockman Big 60 Trace Mineralized Salt is the most popular in the eastern half of the United States. With the six core micro-minerals required for animal health - zinc, manganese, cobalt, copper, iodine and iron - it's the first choice for weight gain, feeding efficiencies and overall herd performance. For all classes of beef and dairy cattle, pigs and horses.

Ingredients:
Salt, Manganese Oxide, Ferrous Carbonate, Magnesium Oxide, Copper Oxide, Zinc Oxide, Calcium Iodate, Cobalt Carbonate, Red Iron Oxide for Color.

Guaranteed Analysis:
Salt (min.) 96.0%, Salt (max.) 99.0%, Manganese (min.) 2,400 ppm, Iron (min.) 2,400 ppm, Copper (min.) 260 ppm, Copper (max.) 380 ppm, Zinc (min.) 320 ppm, Iodine (min.) 70 ppm, Cobalt (min.) 40 ppm.

Feeding instructions:
Allow livestock free access to this feed salt.

Ingredients:
Salt, Sulfur, FD&C Yellow #5 Dye for Color.

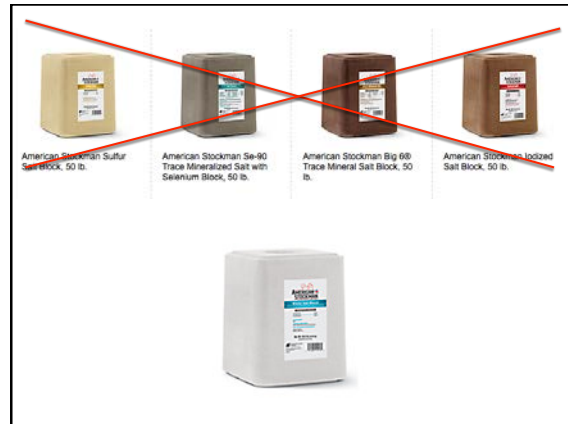
Guaranteed Analysis:
Salt (min.) 95.0%, Salt (max.) 97.0%, Sulfur (min.) 3.0%.

**Ingredients:**

Salt.

Guaranteed Analysis:

Salt 98.0% (min.) 99.9% (max.).



Injectables



copper, zinc, manganese, selenium

ratios of minerals, days supplied

Se toxicity

(image from multiminusa.com)

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 | from Sodium Bicarbonate, MSP and Salt |
| Sodium, (Na) min/max % | 22.5-26.9 | Magnesium Sulfate and Oxide |
| Magnesium, (Mg) min % | 2.0 | Potassium Chloride |
| Potassium, (K) min % | 3.0 | from Elemental Sulfur and sulfates (trace minerals) |
| Sulfur, (S) min % | 4.7 | |
| 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.

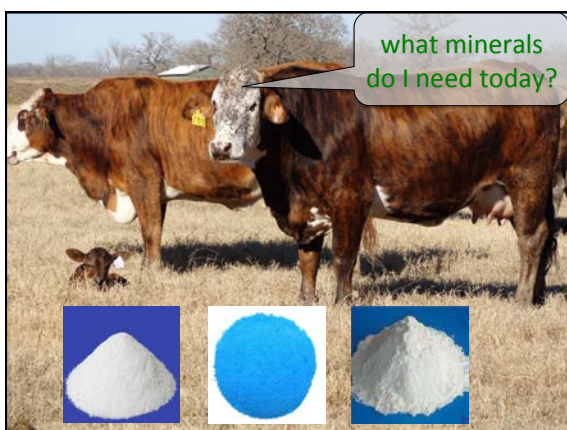


Mineral Feeders

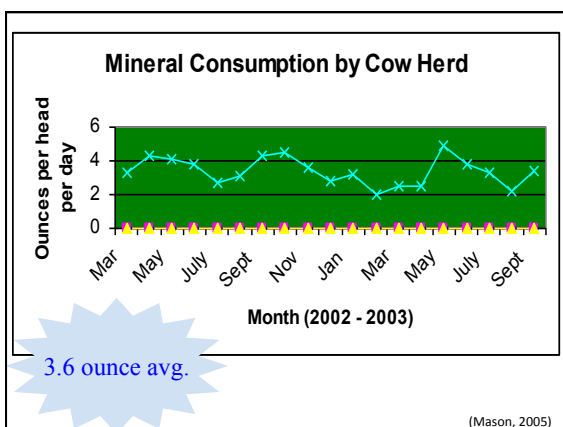




Mineral Intake



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



- if intake is too 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

- dual preference minerals
 - salt
 - P
- inhibitory minerals
 - Mg
- neutral or unknown preference minerals
 - Ca, K, S
 - all trace minerals

additives that stimulate intake

- molasses, yeast, other flavoring agents
- mineral oil and weatherization products



Calculating Mineral Intake

- 35 cows
- put 50 lbs of mineral in an empty feeder
- mineral lasts for 6 days
- $50 \text{ lbs} \div 6 \text{ days} = 8.33 \text{ lbs per day for the herd}$
- $8.33 \text{ lbs per day} \div 35 \text{ hd} = 0.24 \text{ lbs/hd/d}$
- $16 \text{ oz} \times 0.24 \text{ lbs} = 3.8 \text{ oz/hd/d}$

IGR

Horn Fly Control: Feed Additives

Insect Growth Regulators (IGR)
methoprene (ex. Altosid)

- dosage 0.8 – 1.5 mg/100 lbs
- 1300 cow: 10.4 – 19.5 mg/d

4 oz intake

- 80 gm/ton = 10 mg/d
- 120 gm/ton = 15 mg/d
- 160 gm/ton = 20 mg/d

When and What
Do I Feed

FORAGE ANALYSIS

To achieve a balanced formula we do forage analysis to determine your mineral deficiencies. Upon receiving your forage analysis we are able to design a mineral mix that supplements only what is missing in your forage. Sounds like common sense, to supplement only those elements that are missing or unavailable. Yet many industry standard mixes add high levels of a mineral even though the forage has that mineral in excess. Examples are calcium and iron. That wastes money. Moreover, the bitter truth is that excessive levels of certain minerals can actually be a detriment. Our philosophy is simple, "Supplement what is missing; don't supplement what is not missing". As you can see, Texas Range Minerals are different.

Reputable Company with a Nutritionist on Staff

"I appreciate the 'custom mixing' approach of TRM. It just makes sense that different areas of the country would need different levels of different minerals. We have had excellent grass gains on the yearling minerals, up to an extra 3% of a pound, for a low cost and that is important to me. Keep up the good work!"

"We have noticed that calves on this program are much healthier, consume better and convert feed better."

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

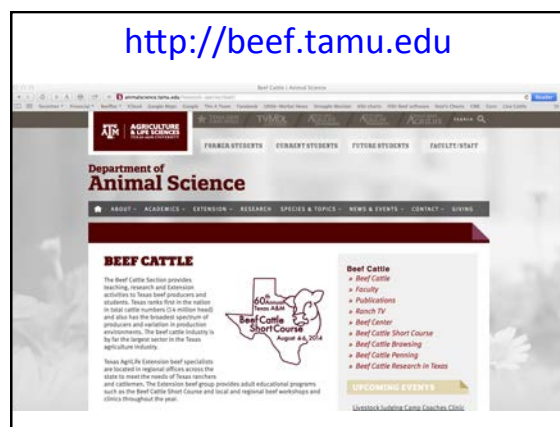
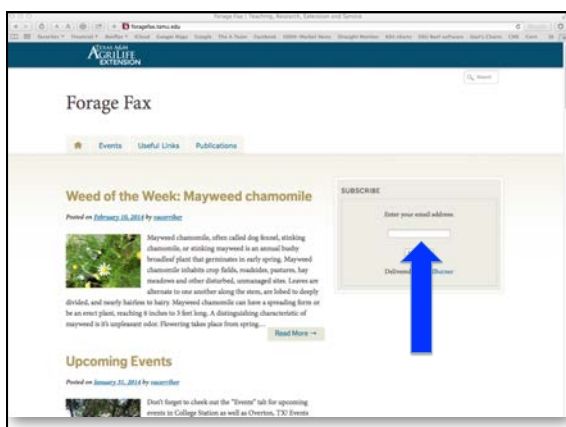
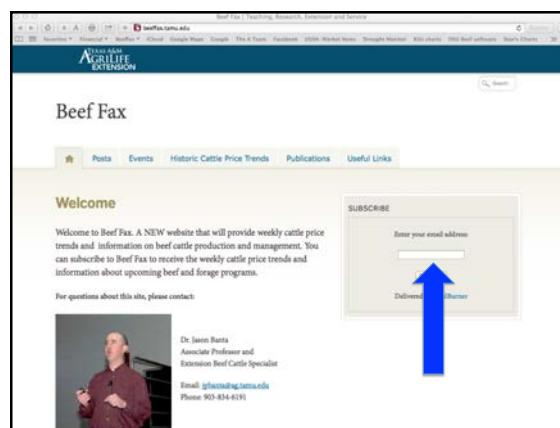
provide vitamin A during drought
and winter if not grazing winter annuals

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>