Controlling Feed Costs and Meeting Animal Needs

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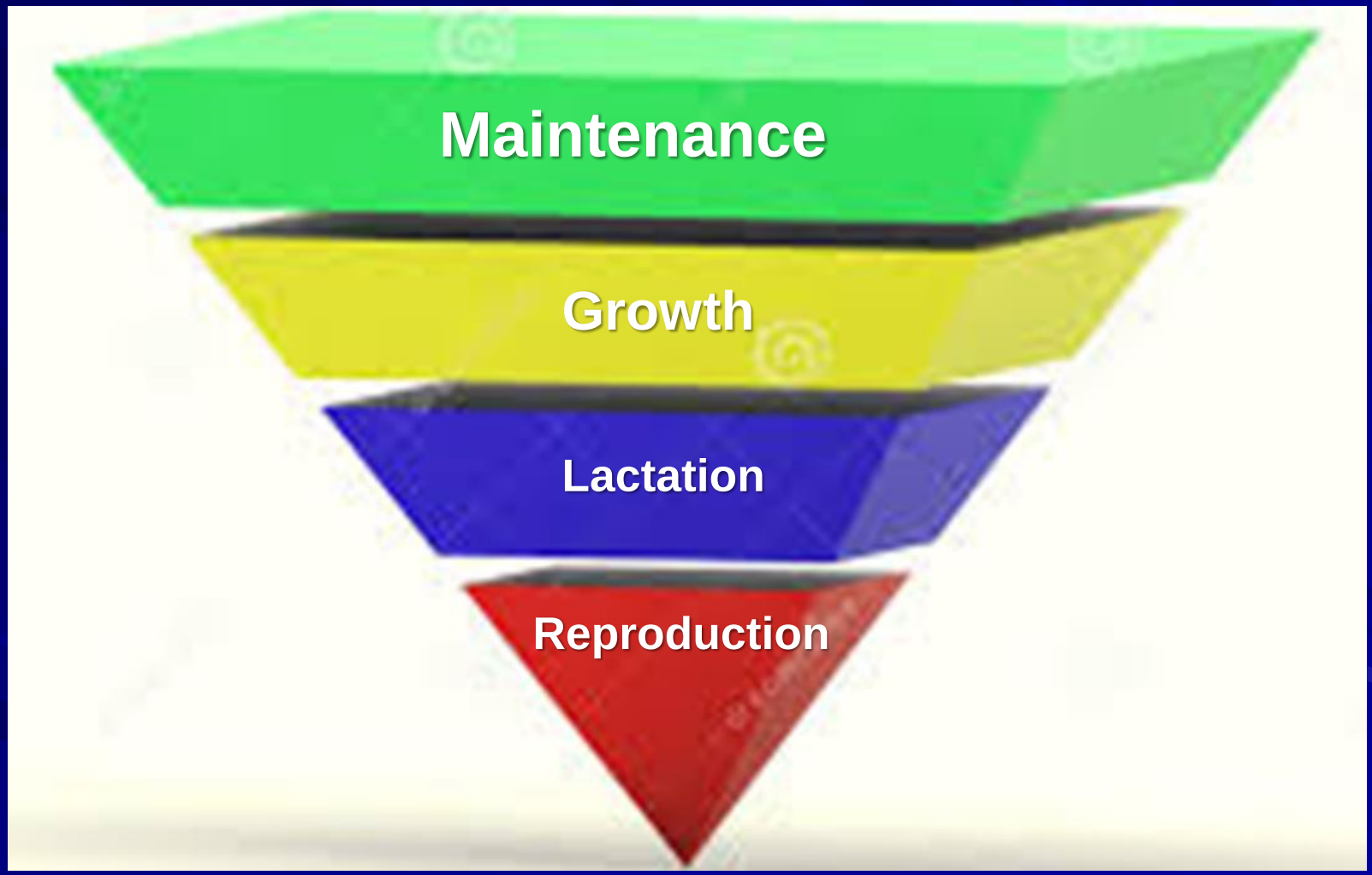
Questions Ranchers Have

- WHAT NUTRIENTS ARE NEEDED?
- HOW MUCH SUPPLEMENT SHOULD I FEED?
- HOW OFTEN SHOULD I FEED?
- WHEN SHOULD FEEDING START AND STOP?

Biological Use of Nutrients



The Big Picture (risk mgt)

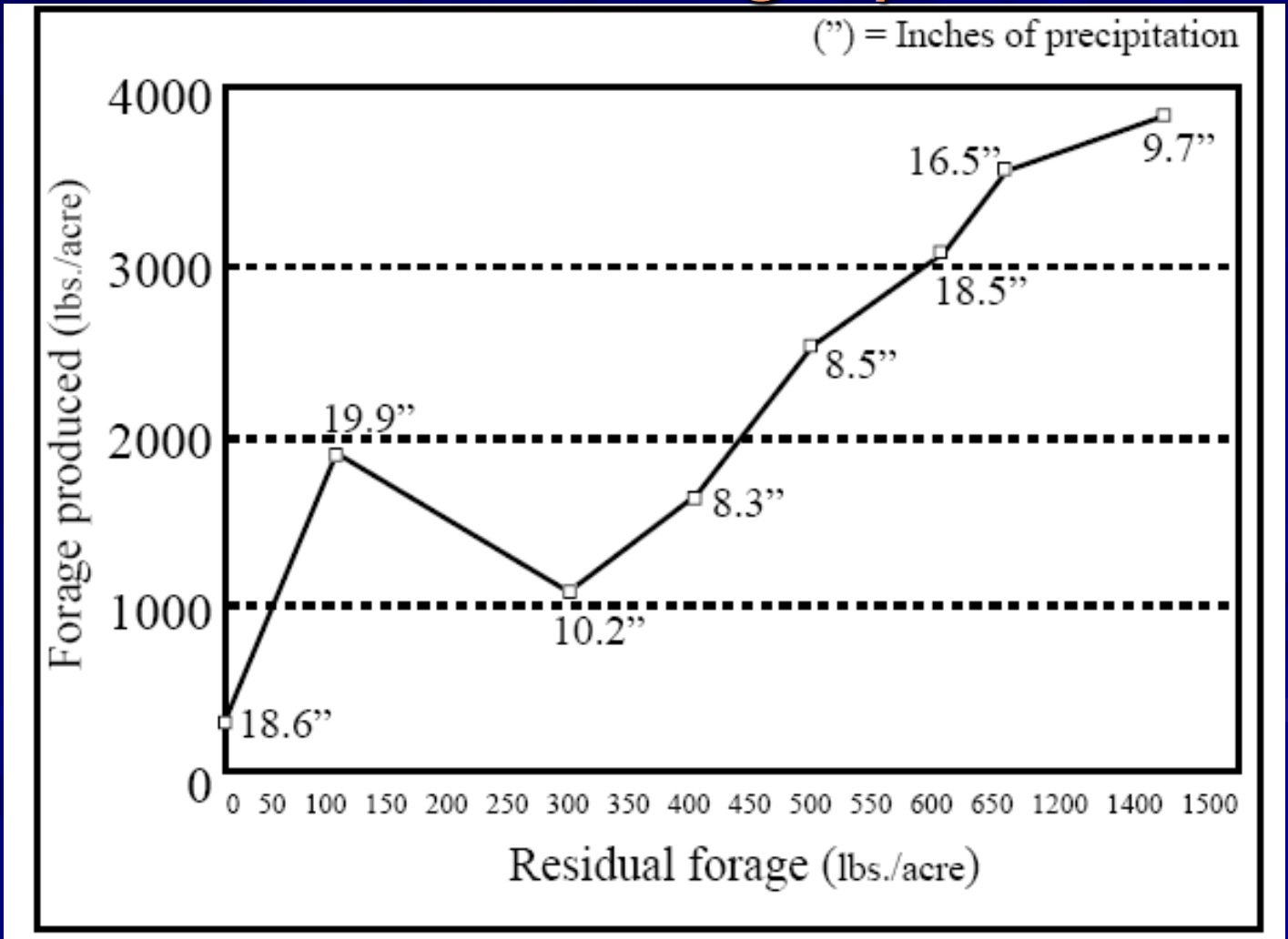
- Moderate stocking allows you to keep a “nucleus herd” together

The Big Picture: Energy

roughage is the main source of dietary energy


Daily DM requirements 2.5 to 3.5 % of body wt

Grazing Management: Residue and forage production



from Hanselka et al. 2001

How Much Forage Do You Have ?

(native range, management of improved forages will differ)

- "Educated Guess" ???
  - Experience is important
- Forage Survey by clip and weigh method
  - By season
  - By range site
  - By "grazable acres"
  - Clip forage, dry forage, weigh dry matter
- Forage Survey by estimate
  - By Season
  - By range site
  - By "grazable acres"

https://agrilifeextension.tamu.edu/library/ranching/photo-guide-to-forage-supplies-on-texas-rangelands/

2649 lb / ac

1220 lb / ac

196 lb / ac

How Much Grass Do I Have ?
How Long Will It Last ?

PASTURE AVERAGE1000 lbs / acre

500 lb / ac Leave ½

"critical residue"

500 lb / ac

250 lb ac
LOST

3000 ac

750,000 lb

$$\frac{\text{250 lb / ac x Number of grazable acres}}{\text{25 lb / day consumption X number of head}}$$

200 hd

= Number of days grazing 150

Grazing Management: Optimal amounts (lb/ac) of forage residue

Desert	Short-grass	Mid-grass	Tall-grass
250	300-500	750-1000	1200-1500

*leave higher amounts ungrazed for improvement or if droughts are frequent

GRAZING ON INTRODUCED PASTURES

MANAGE AND FEED ACCORDING TO NUTRIENT REQUIREMENTS

Growing:

CP .5 kg / day

TDN 3.8 lbs / day

Lactating two year-old:

CP 0.9 kg / day

TDN 5.5 kg / day

Mature, non-lactating:

CP 0.45 kg / day

TND 4.18 kg / day

Mature, lactating:

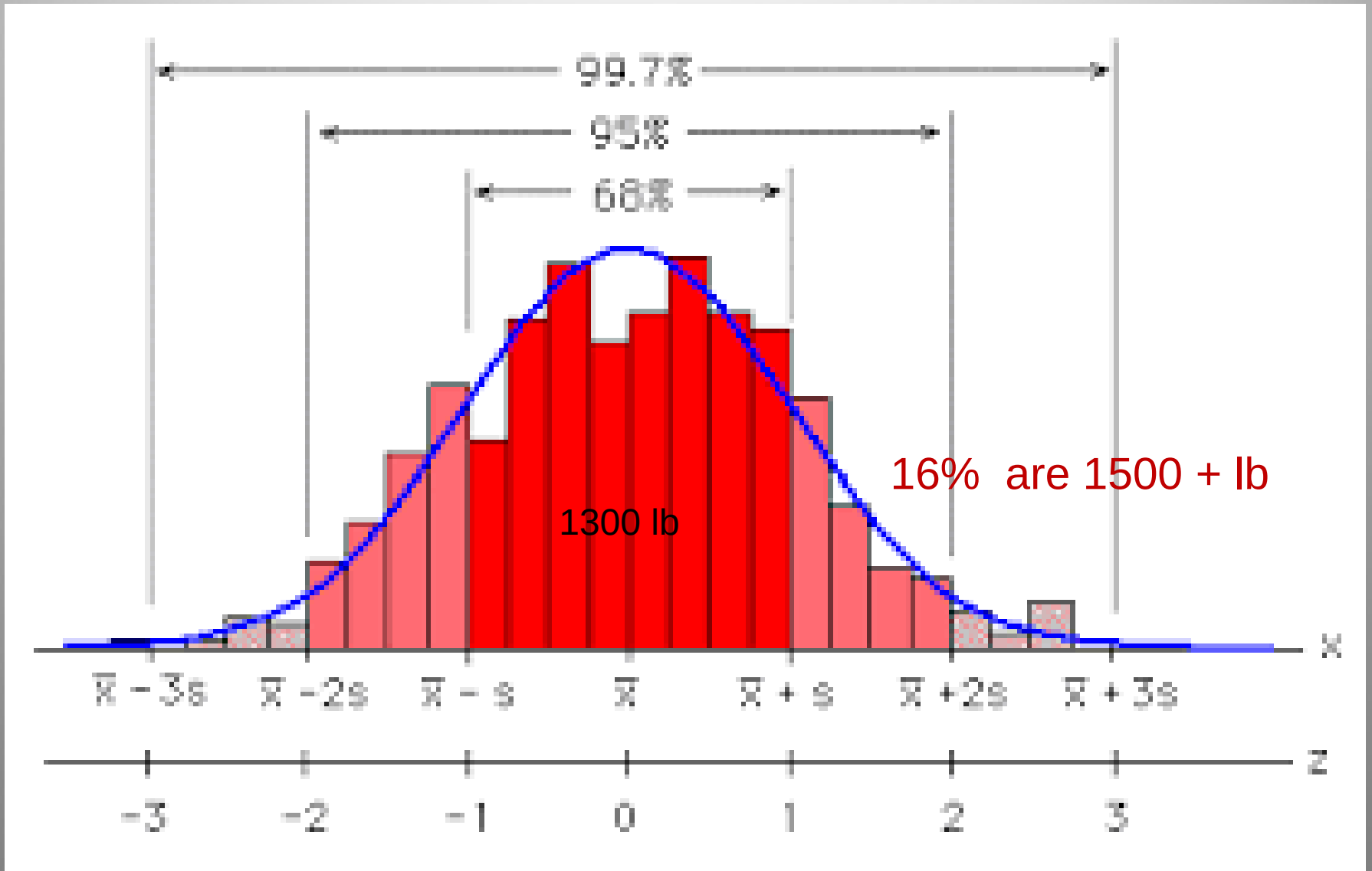
CP 0.95 kg / day

TDN 5.6 kg /day

More Milk Production Means:

- More Forage Must Be Produced and Fed
- Higher Quality Forage Must Be Produced
- Extra Supplements Must Be Fed

“AVERAGE” COW SIZE: 1300 LB, UP 300 LB IN 30 YRS.

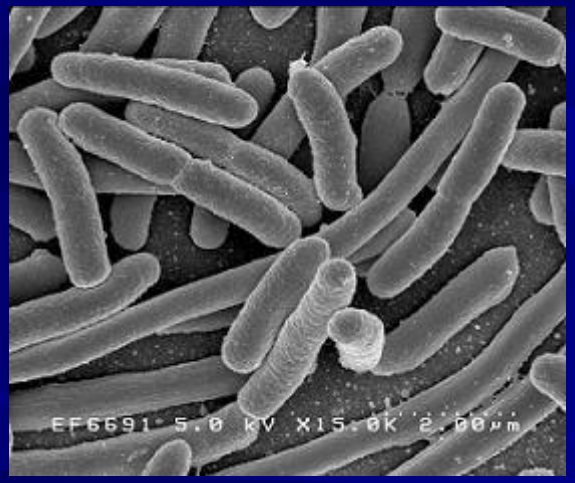


The Nutrients:

- Water 80-90% of a cell's weight
- Protein: "the building blocks of the body"
  - amino acids
- Energy: "the ability to do work"
  - Cellulose, starch, fats
- Vitamins:
  - catalyze chem reactions
  - Immune response
- Minerals:
  - catalyze chem reactions
  - Immune response
  - Structural, bone etc.

Guiding Principal of Ruminant Nutrition

- You are not feeding livestock
- You are feeding rumen microbes, they feed the animal



- Protein
  - Microbial (degradable) from digestion of rumen microbes in small intestine.
    - This is the primary source of protein
  - Bypass from digestion of true protein in the small intestine
- Carbohydrates
  - Cellulose, Starch, Plant Sugars
    - Cellulose is the primary source

CHO → Glucose, feeds microbes → VFAs absorbed from blood

Protein “rules of thumb”

- 7 % CP Diet Required, Just for Rumen Function
- About 12% CP Diet Required for Lactation
- Requirements Affected By:
  - Age, Production Status, Breed

Protein and Poor Quality Forage

- 450 lb heifers fed 4.2% CP hay for 138 days (Univ. Nebraska)

	No Supp	CSM 1.25 lb	Corn 1.25 lb
Hay intake	8.9 lb	12.5 lb	8.9 lb
ADG	- (0.82) lb	0.25 lb	- (0.66) lb

60-70% degradable protein will maximize forage intake

Use of NPN
(non-protein Nitrogen, urea, biuret)

- Depends of Forage
  - Yes: forage plentiful but slightly protein deficient
  - Yes: Low animal protein requirements (i.e. non lactating, mature females
  - No: Forage limited and/or high animal requirements (i.e. growing or lactating)
- NPN is ½ as effective as natural protein
  - i.e a 30% CP supplement, 15 units NPN, 15 units natural protein
  - 22% usable protein

How do you know if nutrient requirements are being met ?

- Body Condition Scoring
  - 1-9 scale cattle, visual
- Forage Sampling
- Hay Sampling
- Fecal Sampling (NIRS / NUTBAL)
  - http://cnrit.tamu.edu/ganlab/
- Examine fecal material

Forage / Hay 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

Determining Hay Quality

sample each cutting

- TDN (i.e. energy)
  - summative equations
  - NDF, ash, CP
  - NDF digestibility
  - cattle, horses, etc.
- Crude Protein

approx. cost $50

BCS 1

BCS 2

BCS 3

BCS 4

BCS 5

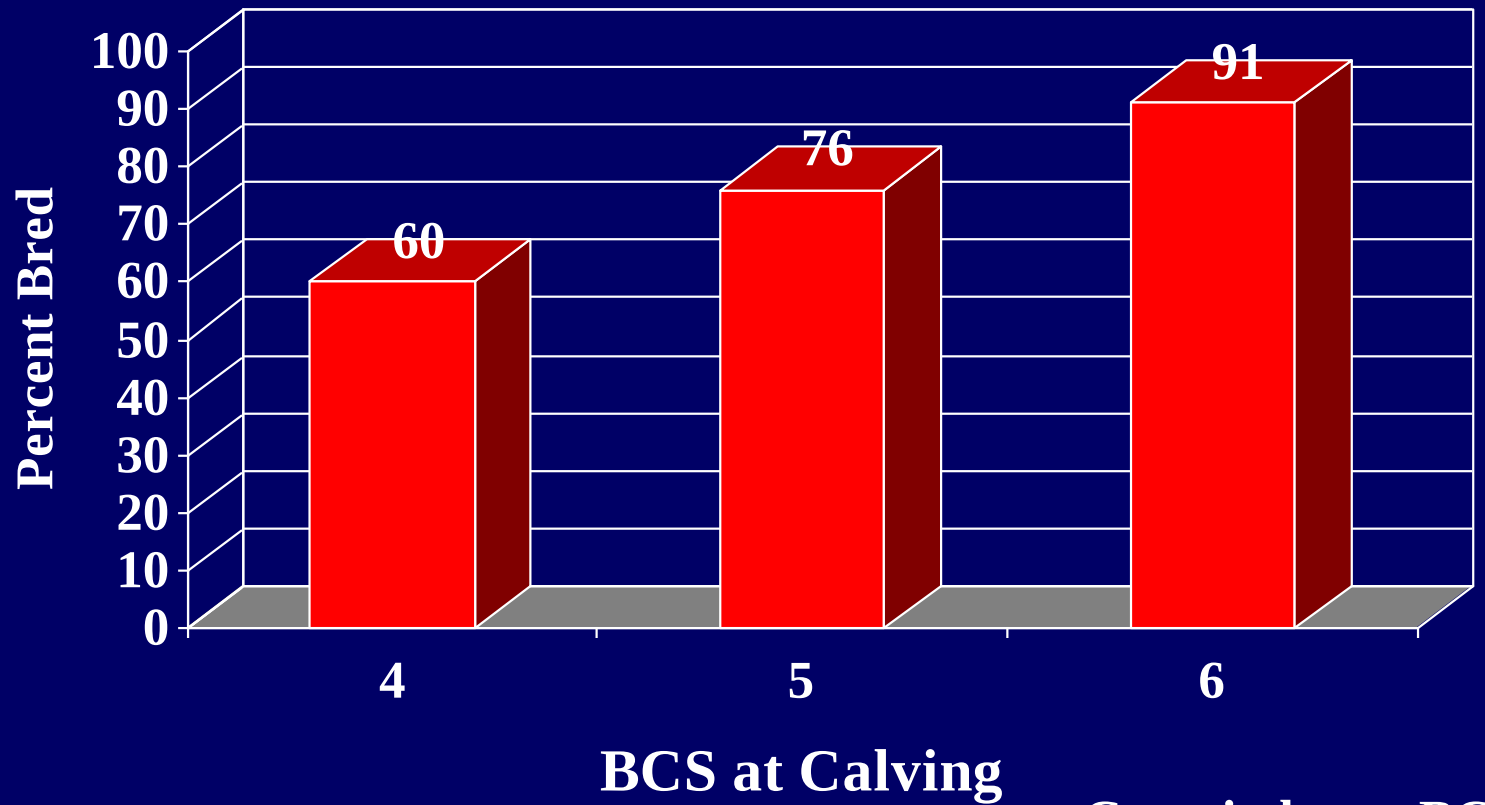
BCS 6

BCS 7

BCS 8

BCS 9

Effect of Body Condition at Calving on Percent Rebred in Beef Cows

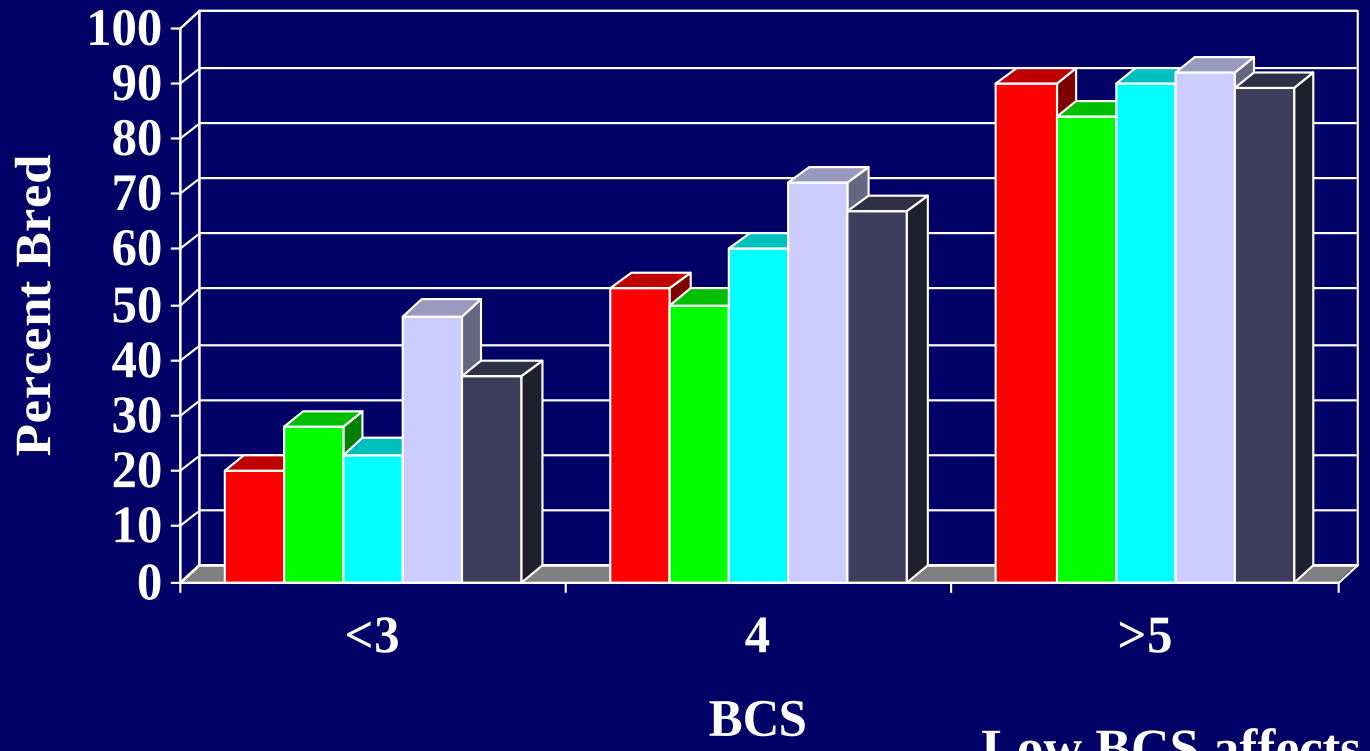


Herd and Sprott, 1986

Cows in lower BCS are less likely to rebreed.

Number of Prior Pregnancies X BCS Affects Present Pregnancy Rate

(n=3734 Florida Cows)



Low BCS affects young cattle more than older cattle.

Rae et al., 1993

48 Hour Calf Removal

Is there a problem here ?

Daily Protein Intake Required to Correct a Protein Deficiency

Percent Protein in Supplement	Protein Deficiency (lbs / day)		
	0.2	0.4	0.8
16	1.25	2.5	5.0
20	1.0	2.0	4.0
32	0.63	1.25	2.5
38	0.53	1.05	2.10

Strategies or Controlling Feed Costs

- feeding losses can range from 2 to 60%
- restrict access to hay through the use of a ring, wagon, or other method
- move feeding location around if possible
  - prevents mud buildup
  - spreads manure

- if unrolling hay only feed enough for 1 d
- require cattle to clean hay up before feeding more

Frequency of Feeding High Energy Supplements vs. Cotton Seed Cake (Wallace and Parker, NMSU)

	Grain Cube 9.4% CP		CS Cake 41% CP
Feedings / week	Twice	Daily	Twice
DM / feeding	6.4 lb	1.83 lb	7.0 lb
TDN / feeding[1]	5.32 lb	1.52 lb	5.32 lb
ADG	-0.03 lb	0.14 lb	0.51 lb
Preg Rate	68 %	94 %	100 %
Cost / head[2]	$22.84	$22.84	$35.88

[1]Based on TDN values of 83% grain cube, 76% CS cube

[2]Based on cost of gain cubes @ $160 / ton and CS cake @ $230 / ton

→ Preg Rate higher with daily vs. 2x / week feeding of grain cubes

→ Weight Gain and Preg Rate higher with CS cake @ $36 / head

CONTROLLING FEED COSTS

Frequency of Feeding High Protein Supplements

(Wallace and Parker, NMSU,

	Trial 1, 130 d		Trial 2, 146 d	
Times Fed	1 / WK (n=43)	3 / WK (n=40)	1 / WK (n=27)	3 / WK (n=18)
Amt per Feeding	6.9 lb	2.3 lb	10.5 lb	3.5 lb
ADG	0.5 lb	0.47 lb	0.34 lb	0.37 lb
Preg Rate	93%	90%	89%	89%
Cost per Head	$14.10 ($27.50)	$14.10 ($27.50)	$24.09 ($50)	$24.09 ($50)

Based on cost of CS cake @ $220 per ton, 1885-86

Adj for feed cost, 2014 @ 432 per ton

Feeding once per week reduced labor and transportation costs by 60%

NM Cattle Growers Short Course, 1992; JAS 1988, Supp 1, 191

CONTROLLING FEED COSTS

Read Feed Tags

- A Feed Tag Must Have:
  - %Crude protein, %Crude fat, % Crude fiber, NPN
  - Ether Extract Includes:
    - fats, oils, fat sol. vitamins, NPN
  - Crude Fiber Includes:
    - Cellulose, Hemicellulose, Lignin

Maximum CF as Guaranteed	TDN
4	79
6	76
8	73
10	70
14	64
18	58
22	52
24	49

Minerals

- What is a good mineral program ?

Minerals

- Salt
  - Don’t put out salt blocks with salted mineral mixes
- Phosphorous: Calcium
  - Females
    - Traditioal recommendation: Ratio 1:1
    - Very important for reproductive function
- Magnesium
  - Small grains, lactating females
- Bioavailability
  - organic sources (chelates) > hydroxyl, > chlorides > sulfates > carbonates > oxides.

Mineral Consumption Affected By:

- Minerals in Water
- Forage Mineral Content
- Forage Availability
- Production Status of the Cow
- Palatability
- Location of Mineral Feeders

12:12 mineral is $1000 / ton

- How can we cheapen that up ???
- Use a 6:12 mix (12:12 may not be as important as we once thought, probably eat more)
  - The big problem with 12:12 minerals is consumption. General rule- the higher the P level in the supplement, the lower and more erratic the consumption will be.

12:12 mineral is $1000 / ton (Cont)

- Compare price based on targeted consumption
  - 4oz, 3oz, 2oz, 1oz, / hd / day
  - Measure consumption
- Remember to account for other sources of P: forage, cubes, etc.
- Don’t put out salt/mineral mix AND salt
- Don’t put out mineral when grass is green ??
  - Forage Testing for P

Vitamins

Symptoms of Vitamin A Deficiency

- Weak, blind or dead calves at birth
- Retained placenta
- Cows come into heat, but fail to become pregnant
- Decreased sexual activity in bulls
- Decreased sperm quality

→ Vitamin A stored in liver for 4 months

Situation One
(adapted McCollum)

- Forage availability is not limiting. CP quality low.
- Forage consumption is low, due to low CP
- Stratiegy: Feed Small amout of supplemental protein
- Supplement Type:
  - > 30% CP, mostly natural, at least 60-65% degradable. Some NPN okay
- Feeding Rate:
  - 0.1 to 0.3% of BW / day. Once to 3 times per week
- Efficiency:
  - 1.5 to 3 lbs supplement per lb of weight gain in dry cows

Is this economical ??

Situation Two

- Forage availability may or may not be limiting
- Quality may or may not be limiting
- Objective: Improve performance by supplying extra nutrients without depressing forage intake
- Strategy: Maintain or increase forage intake, but also provide extra energy
- Supplement:
  - 20-30% CP. Very limited NPN
  - Increase energy with Digestable Fiber
    - Wheat Mids, Corn Gluten, Soybean Hulls, Citrus Pulp
    - As cubes these will be the 15-20% fiber but 50%+ TDN cubes
  - Feed daily to 3 times per week
- Efficiency:
  - 5 to 10 lbs of supplement per lb gain in dry cow

Is this economical ?? If at all only in the short-term. Allows higher stock densities

Situation Three

- Forage availibility is adequate but will be limiting in the future
- Objective: Maintain current level of production, but extend the forage supply into the future
- Stratiegy: Feed a supplement that will depress forage intake, but maintain energy intake
- Supplement Type:
  - 10-18% CP with grain and grain byproducts
  - Feed daiy
- Efficiency:
  - 10 + lbs of supplement per pound of weight gain in growing cattle

Is this economical ???

Calculating Feed Value

- 20% CP, 9%CF, $360 / ton
  - 90 cents per lb of CP : 2000 lb x 20% CP = 400 lb protein. $360 (ton) / 400 = $0.90 / lb CP
  - 25 cents per lb of TDN 2000 lb x 71.5% TDN = 1430 lb TDN. $360 (ton) / 1430 = $0.25 / lb TDN
- 32% cube, 12% CF, $428 / ton
  - 67 cents per lb of CP : 2000 lb x 32% CP = 640 lb protein. $428 (ton) / 640 = $0.67 / lb CP
  - 27 cents per lb of TDN: 2000 lb x 67% TDN = 1340 lb TDN. $360 (ton) / 1220 = $0.27 / lb TDN
- 38 % cube, 13% CF, $432 / ton
  - 57 cents per lb of CP: 2000 lb x 38% = 760 lb protien. $432 (ton) / 760 = $0.57 / lb CP
  - 33 cents per lb of TDN: 2000 lb x 65.5% TDN= 1310 lb TDN. $432 (ton) / 1310 = $0.33 / lb TDN

Summary

- Manage forage quantity to reduce supplemental energy feed costs
- Use the right kind of supplemental protein to maximize forage intake
- Is my program working ?
  - BCS, cow pies, NUTBAL, forage / hay analysis
- Saving feed dollars
  - Have grass
    - reduce the need for energy supplements
    - Allow less frequent feeding
    - Allows some NPN in right situation
    - Feed during mid-day
  - Hay Management
  - Read / know feed tags
- Choose the right & least-cost supplement for the job. i.e. know how to calculate feed value
  - Feed the right amount of supplement
- Know when to start and stop feeding
- Measure mineral consumption
- Breeding season matches the rainy season