Basic Cow Nutrition

2010 Florida Beef Cattle Short Course

Dr. Matt Hersom

Dept. of Animal Sciences

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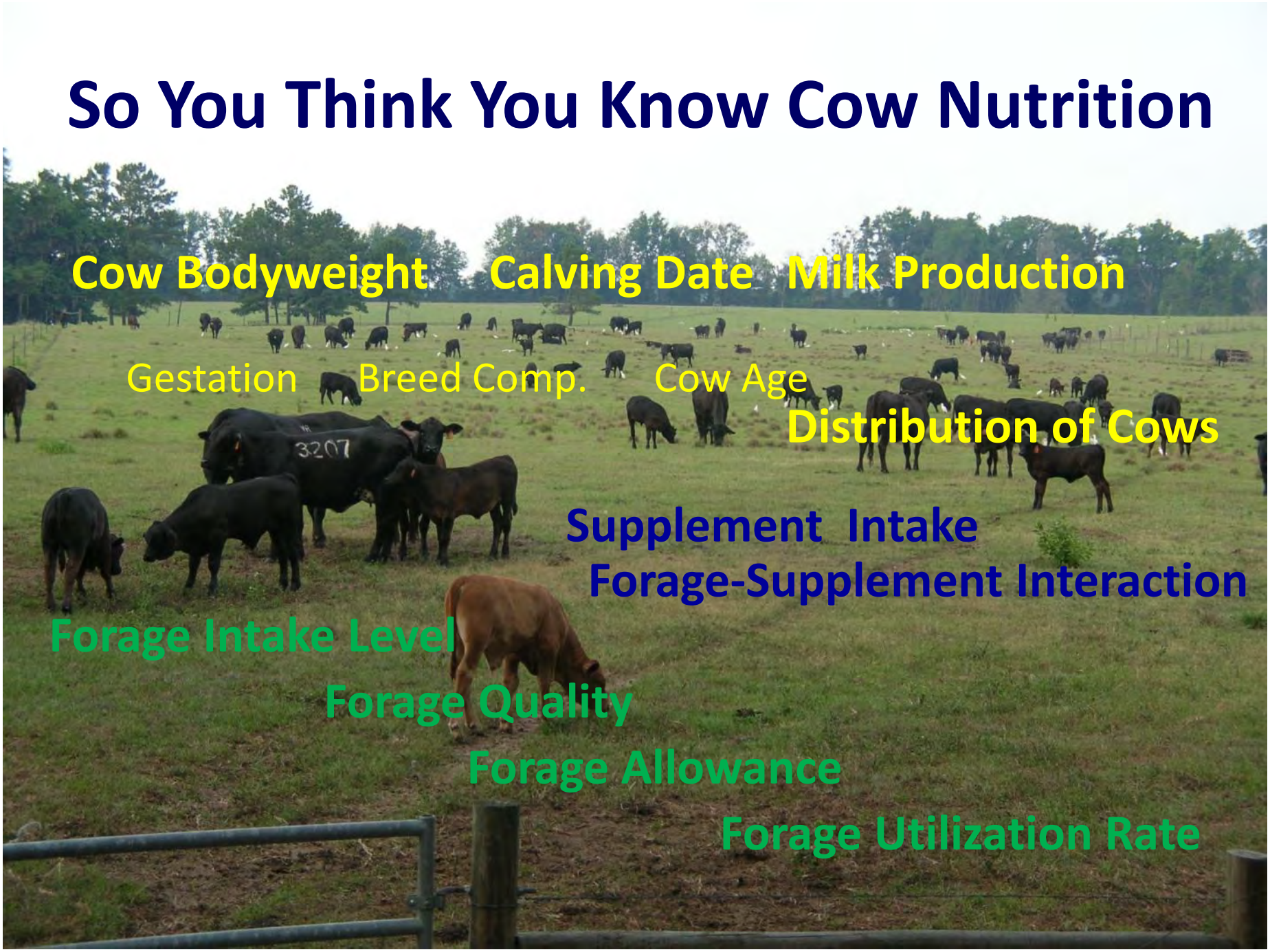
So You Think You Know Cow Nutrition



Importance of the 7 P's

- Prior
- Proper
- Preparation
- Prevents
- Poor
- Production
- Performance

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The Beef Cow's Assignment

- Our expectation of a productive cow
  - Maintain her body weight / condition
  - Deliver a live calf without difficulty
  - Come into heat promptly
  - Conceive early in the breeding season
  - Nourish a developing fetus
  - Adequately nurse the calf through to weaning

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Understand what have you to work with

- Cattle
- Forages
- Feeds

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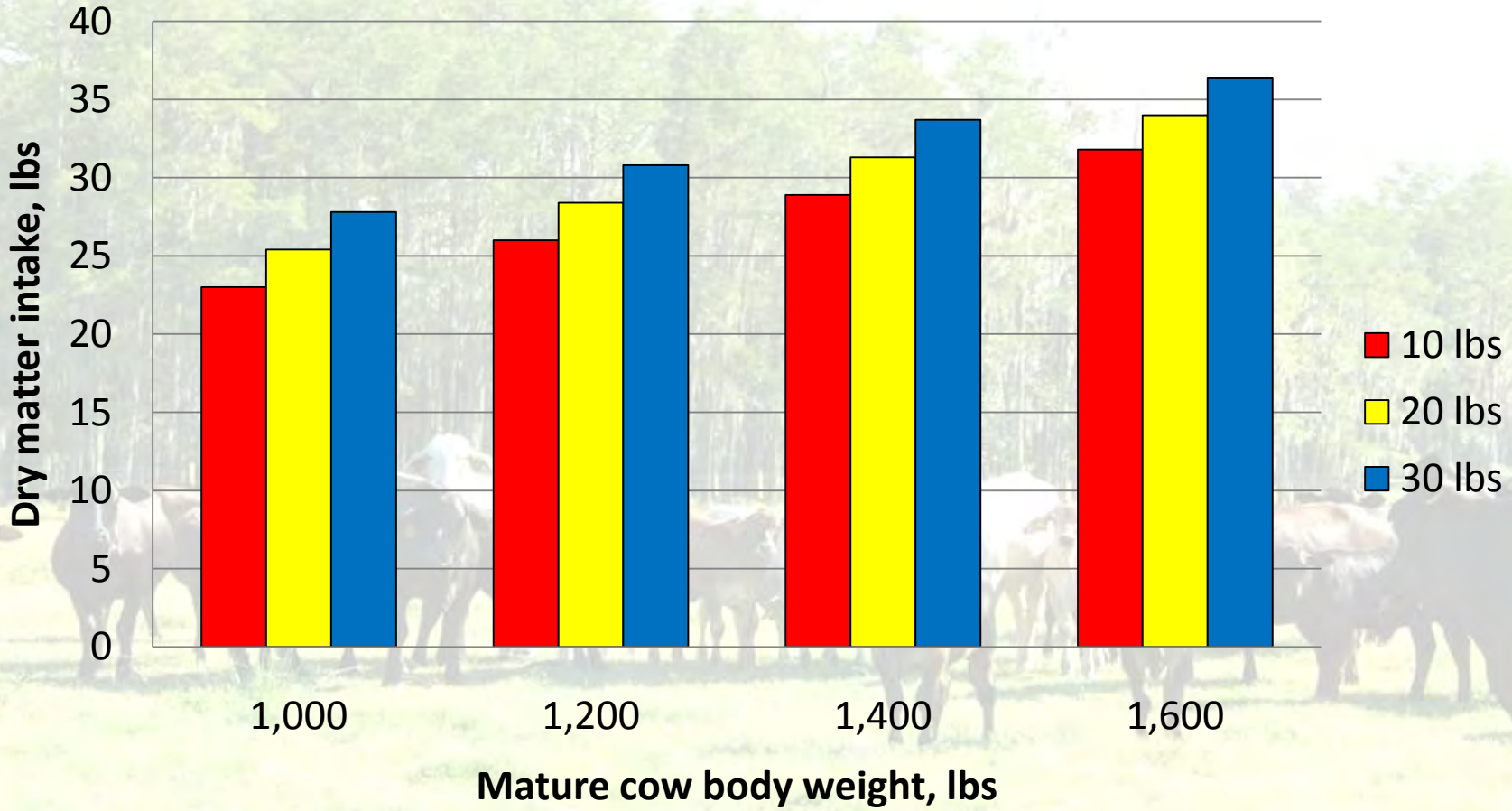
Effect of Cow Bodyweight and Milk Production on Intake Requirement



3 months after calving

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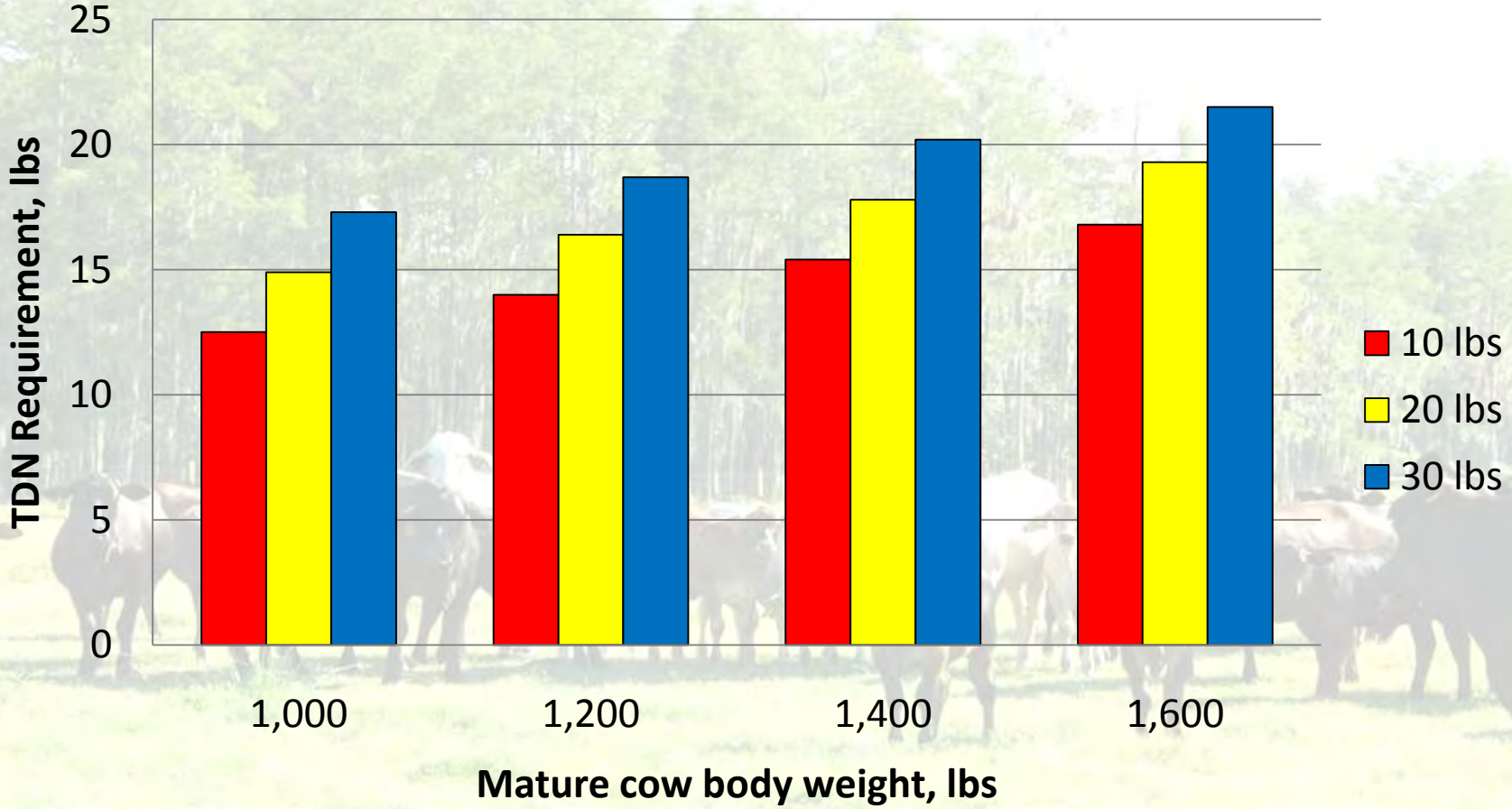
Effect of Cow Bodyweight and Milk Production on Energy Requirement



3 months after calving

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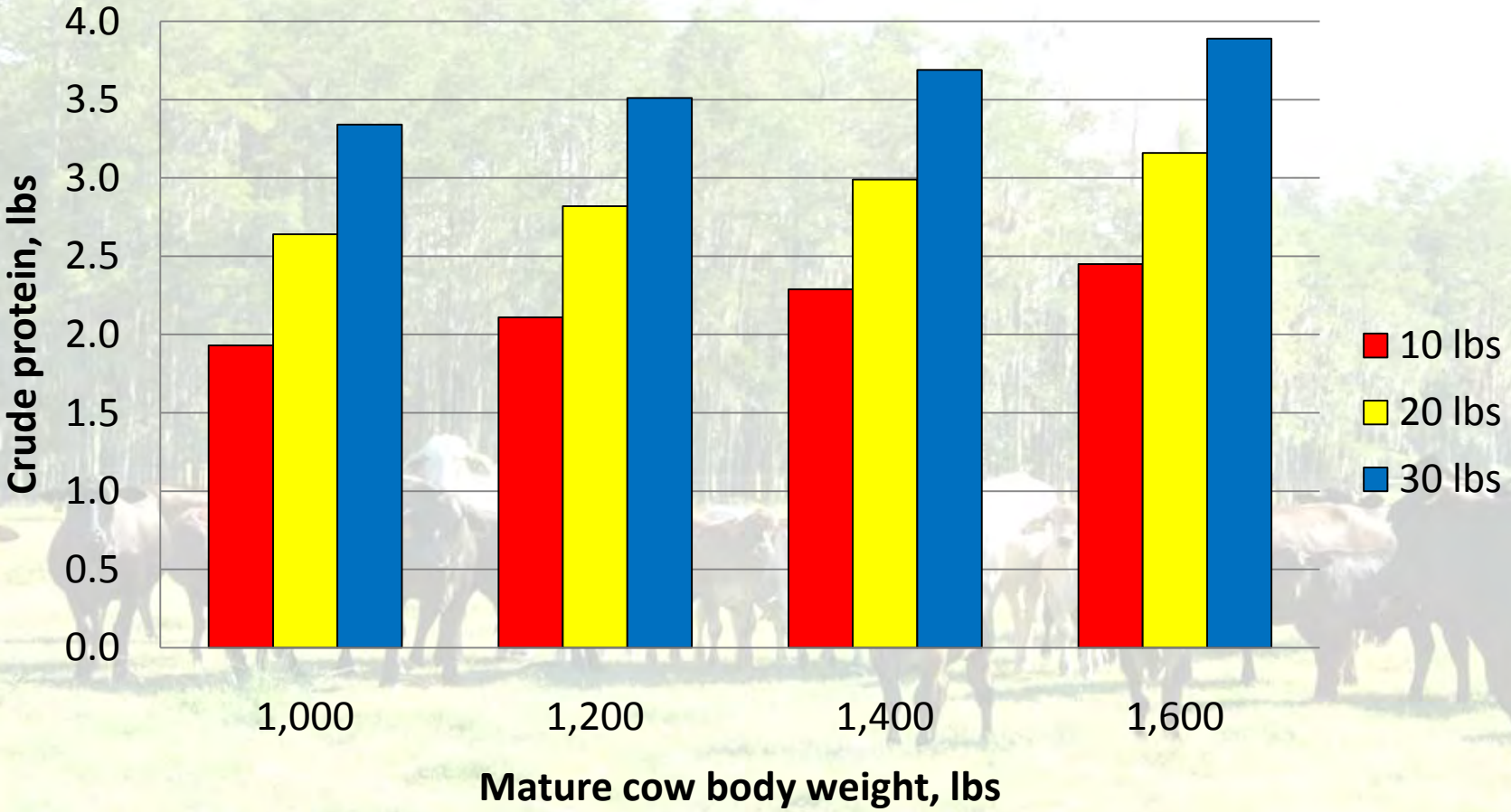
Effect of Cow Bodyweight and Milk Production on Protein Requirement



3 months after calving

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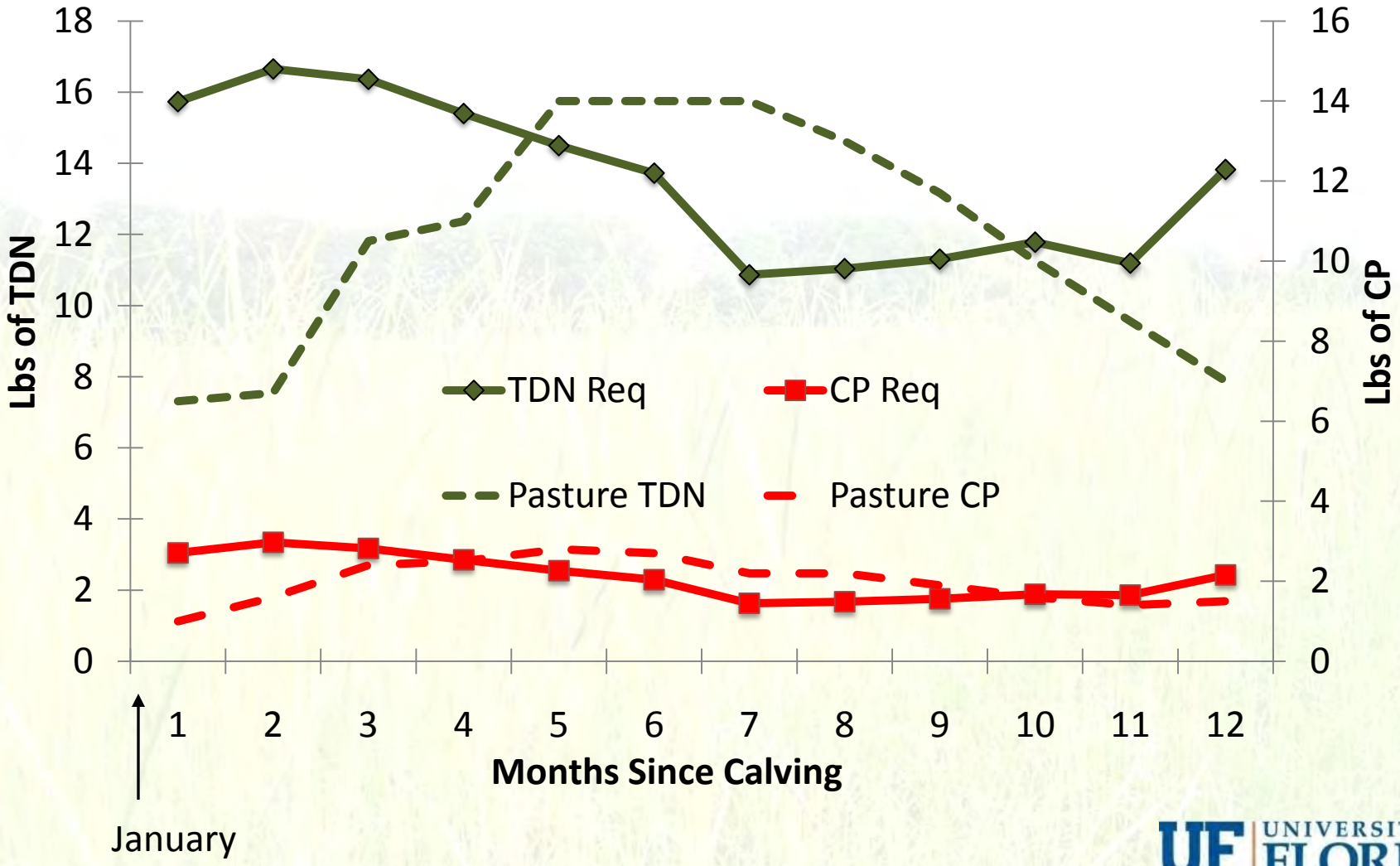
Requirement Cycles in Beef Cows



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Basic Required Nutrients

Water

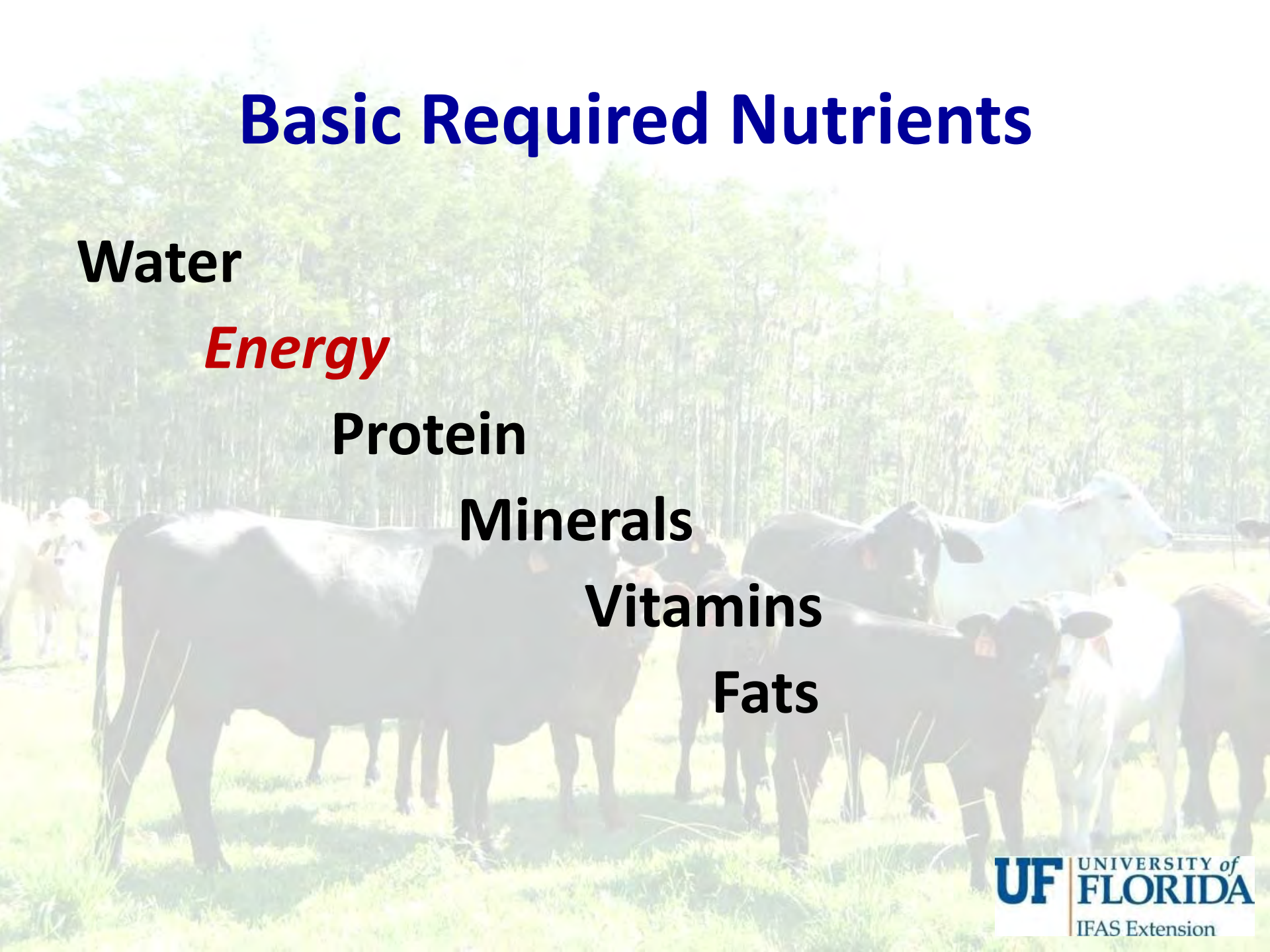
Energy

Protein

Minerals

Vitamins

Fats



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Water

- Water is the most critical nutrient in ALL livestock production:
  - Clean
  - Fresh
  - Consider semi-routine analysis:
    - Microorganisms
    - Chemicals

- To ensure availability and control contamination of waterways, it is best to provide cattle with water derived from a well or control access to surface water.

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Energy

- Total Digestible Nutrients
- Major “nutrient” required by cattle
- Main driver for production
  - Maintenance
  - Growth
  - Reproduction
  - Lactation
- Direct relationship between TDN and quality of feedstuff
- Low quality feed = low energy and low intake

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Energy Use by the Cow

- Hierarchal process to energy use:
  1. Maintenance
  2. Lactation / Growth
  3. Gestation
- Utilize body tissues as energy source
  - Finite source of energy in light of continued production
  - Ultimately will require replacement
- Supplementation
  - Provide energy to meet deficiency
  - Multiple sources and interactions

Feedstuff Options

Feed	TDN,%	Pounds to provide 5 lbs TDN
Whole Cottonseed	95	5.25
Hominy	91	5.49
Corn	88	5.68
Dried Distillers Grains	90	5.56
Soybean Meal	87	5.75
Wheat Middlings	83	6.02
Citrus Pulp	82	6.10
Corn Gluten Feed	80	6.25
Soybean Hulls	80	6.25
Cottonseed Meal	75	6.67
Molasses	72	6.94
Wet Brewers Grains	70	7.14
Peanut Skins	65	7.69
Bahiagrass hay	*55*	*9.09*
Peanut Hulls	22	22.7
Urea	0	--

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Supplemental Energy

- *Begin feeding before it is too late*
- *Response improves with long term low level supplementation*
- *Feeding energy (w/out natural protein) decreases overall energy intake of low quality forage*
- *Usually contain < 20% CP*

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Supplemental Energy Considerations

- *Do not feed when high CP supp. will improve performance*
- *Grain is a **substitute** for forage*
- *High starch supp. decreases fiber digestibility (Negative Associative Effects)*
- *High starch supp. work best with moderate to high quality forage*

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By-products Feeds as Energy Supplements

- Use by-products with low starch, moderate fiber concentrations
- Less impact on fiber digestion
- Energy supplied via digestible fiber and fat
- 15-30% increase in performance / unit of TDN
- Use up to 0.5% of BW

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Nutritional Assessment

- Energy is limiting nutrient if:
  - Cows are thin
  - Forage availability is limited
- Solving Energy limitation:
  - Forage availability is problem then substitute with harvested forage
  - Forage availability is adequate (selection) then supplement with high energy/low protein
- Supplement selection based on $/lb of TDN
- Supply sufficient supplement to meet crude protein deficiencies

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Protein

- Ruminant protein requirements are met by:
  - Diet
  - Rumen microbes
  - Recycling of urea
- Ruminants use microbial- protein as a primary protein source
- Inverse relationship between CP and maturity of forage
- Low quality feed = low CP and low intake

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Protein Supplementation

- Increases forage dry matter intake and digestibility
- Critical level:
  - forage CP < 7% or
  - TDN:CP is >7 (51% TDN: 5% CP)
- Correct protein type is essential
  - Non-protein nitrogen
  - Natural protein
    - Ruminal Degradable Protein (RDP)
    - Ruminal Undegradable Protein (RUP)

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Natural Protein

- Oilseed meal, feather meal, DDGS, CGF, other forages: ryegrass, perennial peanut
- Animal performance: natural>NPN
- Fed as dry or additive in liquid feeds
- Supplies RDP, RUP, energy, and other nutrients
- Proportions of RDP and RUP vary and can affect use and performance in given situation

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Non-Protein Nitrogen

- Synthetic (Urea, Biuret) chemical compounds that contain a nitrogen source not associated with protein.
- Improvement in performance compared with no supplementation
- Utilization rate may be reduced because of decreased forage digestibility potential
  - 50% utilization rate on low-quality forage
- Lacks energy, vitamins, and minerals
- Urea is a common NPN source used in cattle supplements.
- Rumen microbes are able to use NPN to synthesis microbial protein. Requires a carrier that supplies energy
- Success of utilization depends on adequate ruminal energy for microbes

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Feedstuff Options

Feed	Crude Protein, %	Degradable Protein	Undegradable Protein	Pounds to provide 2 lbs CP
Urea	281	100	0	0.71
Cottonseed Meal	49	70	30	4.08
Soybean Meal	49	65	35	4.08
Dried Distillers Grains	30	30	70	6.67
Wet Brewers Grains	24	41	59	8.33
Corn Gluten Feed	24	75	25	8.33
Whole Cottonseed	23	69	30	8.70
Wheat Middlings	18	77	23	11.11
Peanut Skins	17			11.76
Soybean Hulls	12	58	42	16.67
Hominy	12	47	53	16.67
Corn	9	45	55	22.2
Citrus Pulp	9	43	57	22.2
Bahiagrass hay	8	63	37	25.0
Peanut Hulls	8	75	25	25.0
Molasses	5	100	0	40.0

Nutritional Assessment

- Protein is limiting nutrient if:
  - Energy is satisfactory
  - Cows in adequate BCS for energy mobilization
  - Forage availability is not limited
- Solving Protein limitation:
  - Forage availability is adequate then supplement with high crude protein
    - Natural protein (RDP) improves forage utilization
    - NPN in molasses 50% utilization
    - RUP source improves animal performance after RDP is met
- Supplement selection based on $/lb of CP
- Supply sufficient supplement to meet CP deficiencies and monitor energy status

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Vitamin-Mineral Supplementation

- Vitamin-Mineral deficiencies cause problems regardless of protein/energy
- Deficiencies in forage
  - especially low quality
  - fast-growing and/or winter annuals

- Other supplements may alter mineral availability in forage
- Efficacy of all other supplementation depends on vitamin/mineral adequacy

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Feeding the Beef Cow

- If you feed cost are extremely high:
  - May indicate that cow nutrient needs and forage nutrient supply do no match
    - Does the cow match the nutritional environment
    - Consider altering production calendar

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Nominal groups in the herd

- Dry, mature pregnant cows in good condition
- Lactating mature cows
- Lactating young cows
- Pregnant replacement heifers
- Weaned replacement heifers
- Growing market steers and heifers
- Herd bulls

All have different nutritional requirements.
How can you feed them together?

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Assessing Effectiveness of Nutrition

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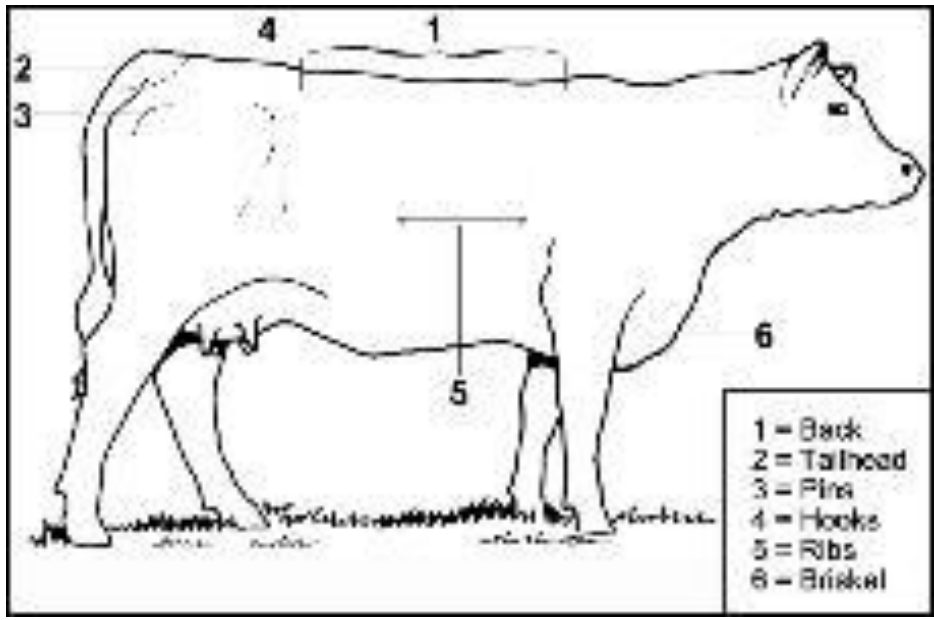
Cow BCS is most often influenced by the lack of available forage

How to tell if cattle are getting adequate nutrition

- Body Condition Score
- Estimation of body fat
- Gauge effectiveness of feeding program
- Decision tool to determine future feeding needs
- Scale of 1 to 9
- Most Florida cows score from 3 to 7
  - BCS 3 = 7 to 9% fat.
  - BCS 5 = 15 to 18% fat.
  - BCS 7 = 25 to 27% fat.



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Cow Body Condition Score

- Body condition score is the best measure of past nutritional status and a good indicator of future reproductive performance.
- ***5 is the magic number!***

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Body Condition Score (BCS)

- A medium frame cow weighs about 1100 lb at BCS 5.
- A similar cow weighs approximately 950 lb at BCS 3.
- Each condition score changes weight approximately 75 lb.

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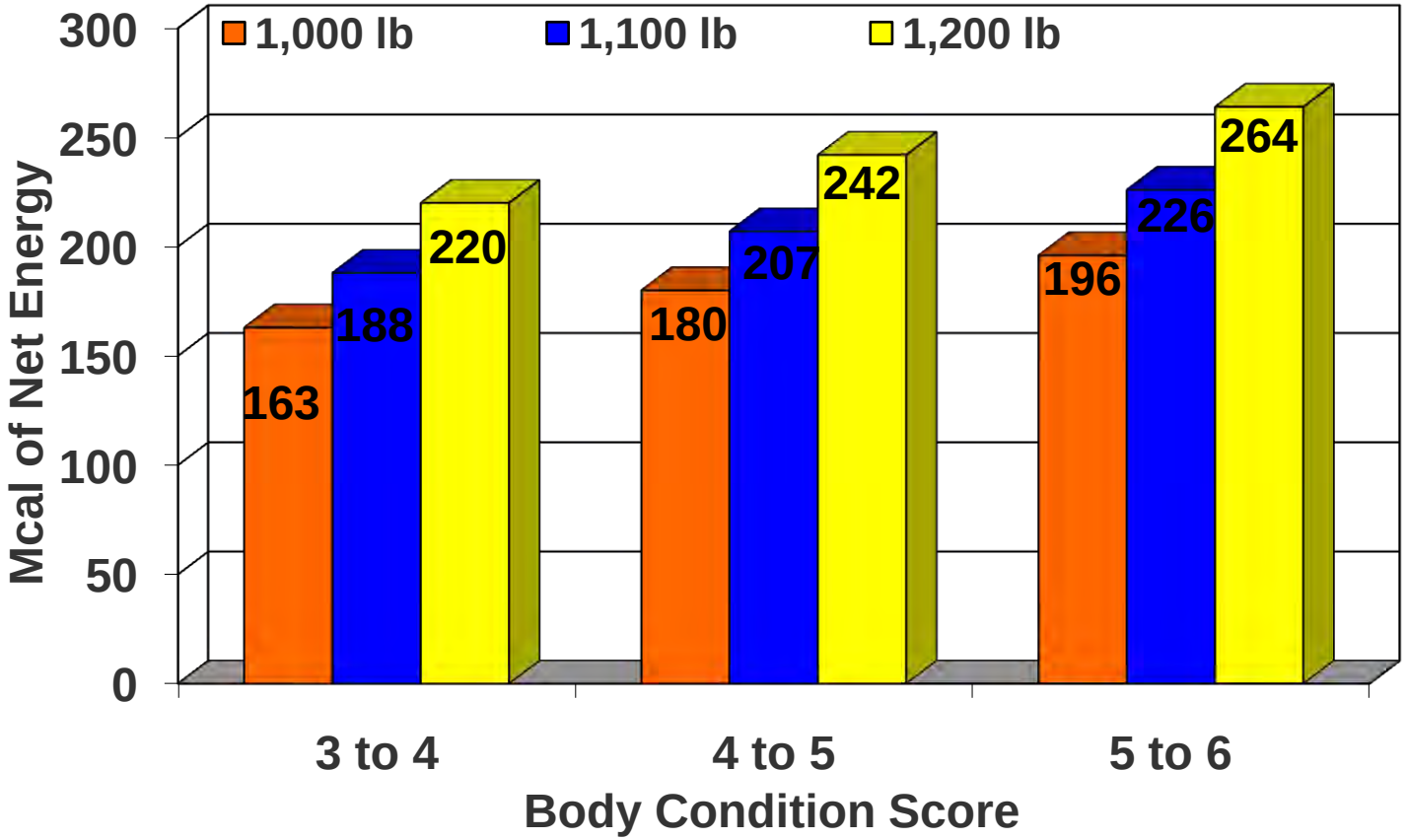
Energy required for cows with different BW to increase BCS



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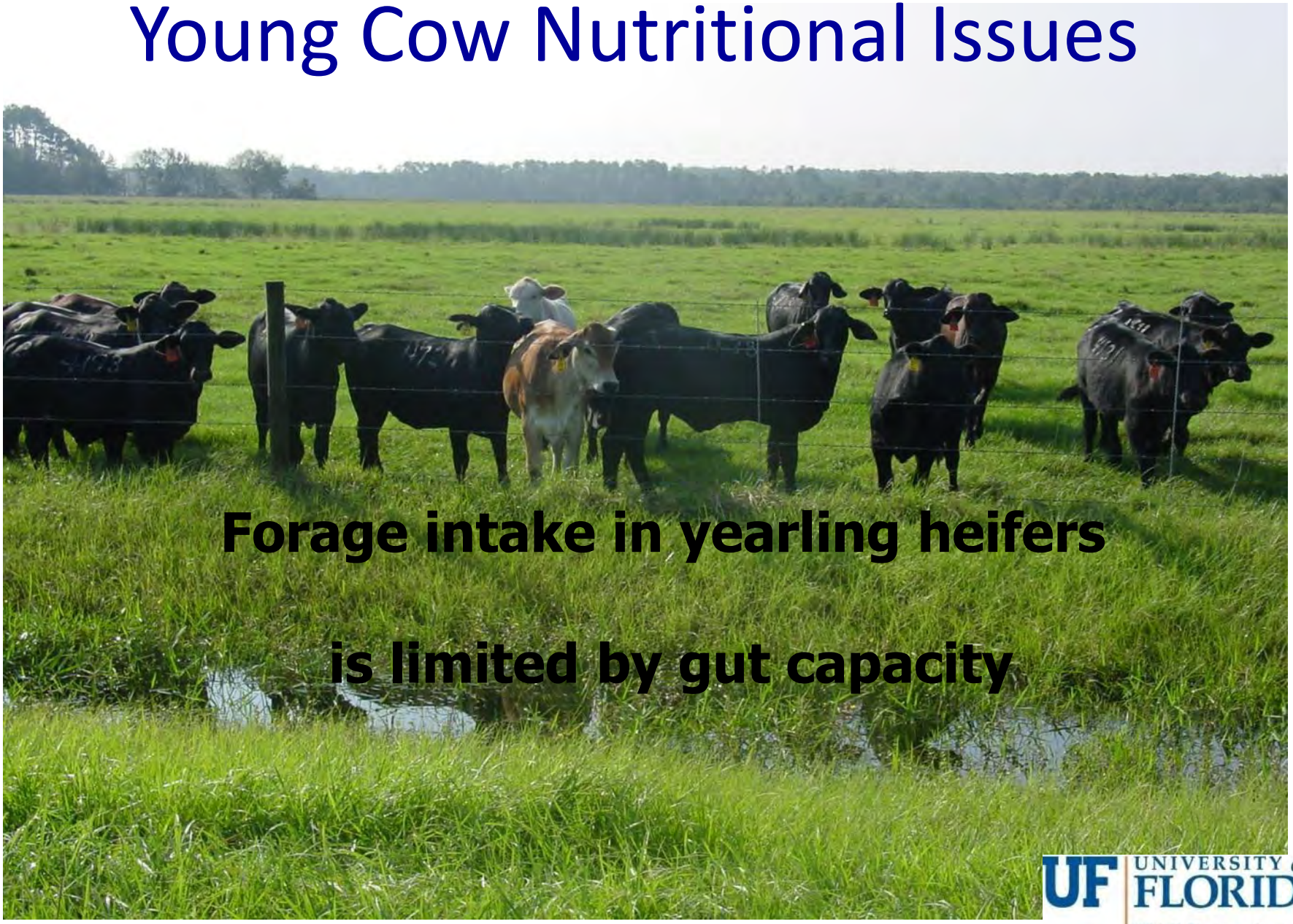
Young Cow Nutritional Issues



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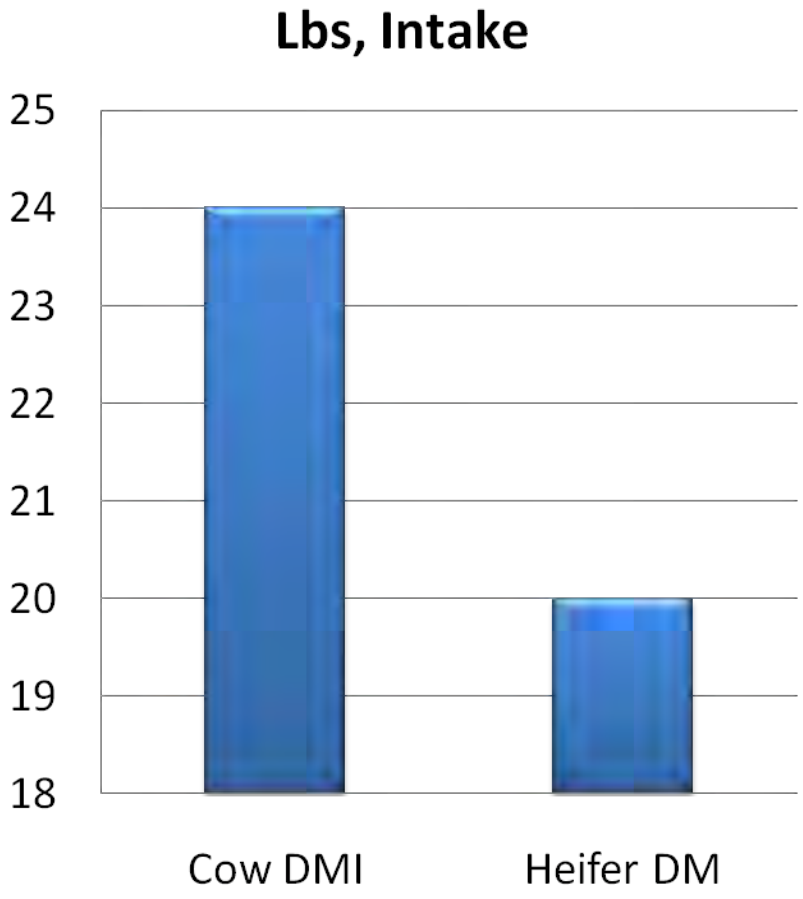
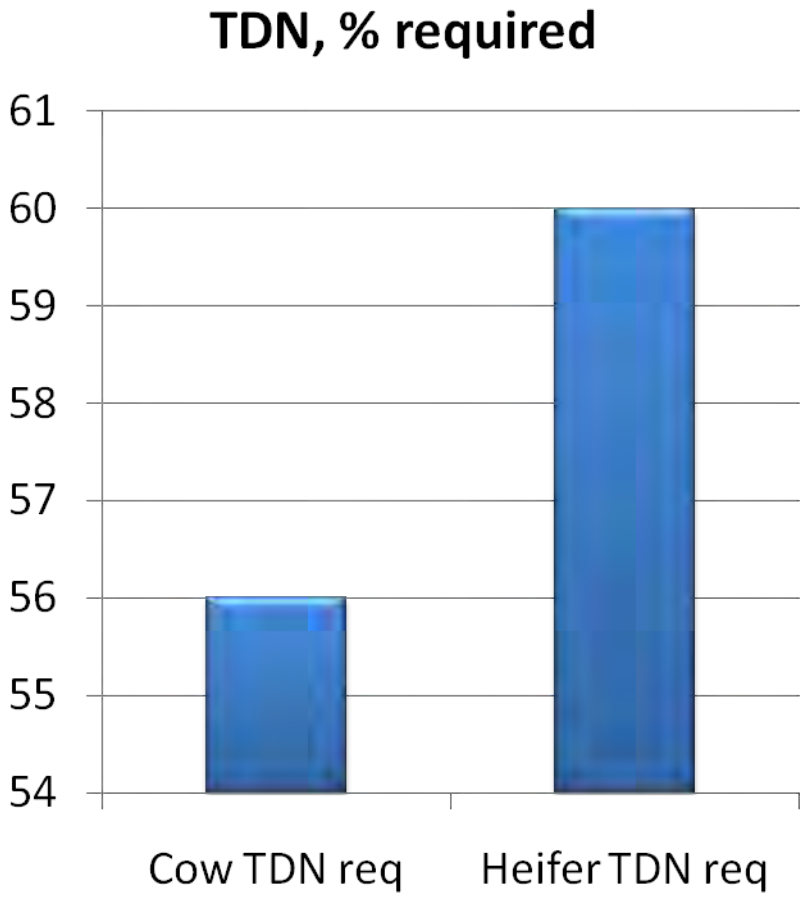
Comparison of Cow vs Heifer Energy Requirement





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Conclusion

- Ability to meet requirement is constrained by forage and cattle characteristics
- Grazing forage alone often does not meet energy and/or protein demands of cattle
- Cow herd nutrition can be complicated
  - Forage quality
  - Forage availability
  - Cattle requirements change
  - Supplement characteristics
- Evaluate feedstuff on a price / unit of nutrient
- Nutritional decision making process should be economical and biological

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Final Remarks

- Underfeeding the cow herd before or after calving really affects 2 calf crops, this year's and next year's.

- THE MOST IMPORTANT NUTRIENT IS THE ONE THAT IS MISSING!

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Dr. Matt Hersom

Dept. of Animal Sciences