

High Milk Production Decreases Cow-Calf Productivity Within a Highly Available Feed Resource Environment

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Focus in the beef industry has been to maximize profit by using trait selection. In doing so, cow-calf producers have tended to select for short-term traits, such as growth and milk yield, to increase weaning weights of calves for the potential to increase profitability. These selection traits do play a role in profitability for cow-calf producers; however, calf body weight at weaning, for instance, only accounts for 5 percent of profitability for the producer in a profit model. Selection for increased milk yield results in an increase in cow maintenance energy requirements. Therefore, there is a higher input cost of feed to maintain cows with a greater milk yield. The objective of this study was to evaluate the effects of actual milk yield in mature beefs cows on pregnancy rates, cow body weight, cow body condition score, calf body weight and gain.

- Over a two-year period, data were collected from 237 three- to nine-year-old Angus-sired beef cows on three research stations in Tennessee. On approximately days 58 and 129 postpartum, 24-hour milk production was measured with a modified weigh-suckle-weigh technique using a milking machine. Subsamples of milk were collected for analysis of milk components. Milk yield data

were used to retrospectively classify cows on actual milk yield as High (≥ 10 kilograms per day), Moderate (8-9 kilograms per day) or Low (< 8 kilograms per day).

- Timed-AI pregnancy rates were the lowest in the High milk-producing cows with no difference between Low and Moderate milk cows. In addition, overall pregnancy rate continued to be the lowest in High milk-producing cows with the greatest pregnancy rate in Moderate milk cows. Calf mid-weight at ~day 58 was increased in calves from Moderate and High milking cows. However, calf body weight at weaning was not different among calves from different milk treatment groups.
- Results from this study suggest that even in management systems that modify the grazing environments with harvested feedstuffs, high milk production decreases reproductive efficiency. In addition, increasing milk production up to day 129 postpartum did not result in increased calf body weight at weaning, indicating that the genetic potential for calf body weight at weaning could not be improved with increased genetic potential for milk production.

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Effects of Pre- and Postpartum Mineral Supplementation on Primiparous Beef Heifer Reproductive Performance

Hawley, J. et al. University of Arkansas, Division of Agriculture, Department of Animal Science
Arkansas Animal Science Department Report, Arkansas Agricultural
Experiment Station Research Series 638:17-18 (December 2016)

Co-products from ethanol production have become a prevalent cost-effective alternative for coping with high prices for feedstuffs, such as corn. As a result, these co-products have become more widespread in cow-calf operations as a feed source. Sulfuric acid used during ethanol production to optimize fermentation and distillation conditions has had the unintended consequence of contributing to elevated sulfur (S) concentrations in co-products. Copper (Cu) status in cattle is susceptible to a number of antagonists, including S, to potentially result in poor reproduction. Accordingly, the effects of excess dietary S on pre- and postpartum nutritional management and subsequent reproduction have gained interest because dietary S concentrations have increased as the consumption of co-products has increased. The influence of pre- and postpartum S supplementation on subsequent reproductive performance has not been widely investigated, and it is plausible that greater dietary S would decrease beef heifer reproductive performance due to a reduction in Cu absorption and utilization. Therefore, the objective of this study was to evaluate the influence of pre- and postpartum dietary Cu and S supplementation on beef heifer reproductive performance.

- Thirty-six primiparous beef heifers (20 ± 0.5 months of age) of predominantly Angus breeding were stratified by body weight (876 ± 54.8 pounds), body condition score and anticipated calving date and

assigned to 12 pens for a 260-day study. Pens were assigned randomly to one of four treatments: 1) 0.15 percent S and 3 milligrams Cu per pound; 2) 0.15 percent S and 5 to 6 milligrams Cu per pound (3 to 4 milligrams from tribasic Cu chloride); 3) 0.55 percent S (from sodium sulfate) and 3 milligrams Cu per pound; or 4) 0.55 percent S (from sodium sulfate) and 5 to 6 milligrams Cu per pound (3 to 4 milligrams from tribasic Cu chloride). A cracked corn and soybean meal-based supplement delivered each treatment starting at 170 ± 16 days of gestation through 150 ± 16 days in lactation.

- Synchronized estrous response was not influenced by mineral supplementation. However, reproductive tract scores and synchronized conception rates tended to be greater for heifers supplemented with Cu, whereas reproductive tract scores and synchronized conception rates tended to be lower for heifers supplemented with S. Responses in reproduction to Cu, zinc and manganese supplementation in ruminants have been variable, and the simultaneous supplementation of several trace minerals has made interpretation of the results difficult. Yet, the beneficial reproductive performance observed in the current study, when Cu supplementation was provided, suggests trace minerals positively impact reproductive performance.

Relationships of a Novel Objective Chute Score and Exit Velocity With Growth Performance of Receiving Cattle

Bruno, K.A. et al., University of Kentucky
Journal of Animal Science 94:4819-4831 (November 2016)

Animals with excitable temperaments often have decreased gains that have been associated with decreased intake and efficiency. Different temperament measures probably measure different specific underlying traits. Commonly used temperament measures include both objective and subjective measures.

- One objective of this experiment was to evaluate two related, but different, measures associated with temperament, where one measure is a new, objective measurement based on the common subjective chute score measures. Also, there is reason to

believe that ruminally degradable protein (RDP) requirements of animals may vary with temperament. To examine the relationships between temperament measures and nutrient use, 192 cross-bred steers were used in a 58-day randomized complete block design experiment. Temperament treatments (assigned prior to day 1) were chute exit velocity (EV; slow vs. fast) and objective chute score (WSD; low vs. high), a novel temperament measure that was the standard deviation of weights collected at 5 Hz for 10 seconds while an animal was

restrained in a chute with its head caught. Both were measured on days -8, 1, 2, 16, 30, 56 and 58, where day 1 was the day that animals were allotted to treatment groups and began receiving experimental diets. Steers were fed a diet with one of three RDP levels (75 percent, 105 percent and 120 percent of RDP requirements).

- There were no main effects or interactions with ruminally degradable protein. Slow EV animals had greater average daily gain and dry matter intake than fast EV animals, but there was no effect of EV on gain:feed ratio. For day 0 to 58, high WSD animals had greater dry matter intake than low

WSD animals but no difference in average daily gain, whereas low WSD animals tended to have increased gain:feed ratio.

- Results of this study give additional confirmation that EV is associated with dry matter intake and growth and provide evidence that a novel measure of behavior, WSD, is also related to growth, independently of EV. Because WSD and EV appear to measure different underlying behavioral traits, use of both measures may improve our ability to discriminate among temperament categories for growing cattle.

Impact of Contemporary Light Sources on Oxidation of Fresh Ground Beef

Cooper, J.V. et al., University of Missouri and Clemson University
Journal of Animal Science 94:4457-4462 (October 2016)

Color is one of the driving factors in consumer purchasing decisions regarding meat products in a retail setting. As oxymyoglobin (MbO₂) transitions to metmyoglobin (MMb), meat color subsequently changes from a desirable bright cherry red to an undesirable brown color. This color change often results in a decreased willingness of consumers to purchase meat products, leading to discolored meat products being sold at discounted rates. Fifteen percent of total retail sales of meat products were discounted due to product discoloration, resulting in a loss of \$1 billion of revenue annually.

Oxygen tension, temperature, surface microbial growth and lighting conditions are the major factors that play a role in the alteration of meat color shelf life. Fluorescent bulbs are the most common light source utilized within meat cases in retail settings today. However,

light emitting diodes (LED) are evolving quickly within retail settings. LED bulbs have the advantage of a longer life span and an increased energy efficiency.

- USDA Select top rounds (n = 20) were processed to produce ground beef at two different fat levels (5 and 25 percent) and made into patties (113.4 grams). Patties were packaged with oxygen-permeable polyvinyl chloride, assigned to one of three lighting treatments (low UV fluorescent [FLO], light emitting diode [LED] and no light [DRK, negative control]) and placed within deli cases at 5°C. Patty removal for evaluation occurred on retail display days 1, 3, 5 and 7.
- Results indicate that light treatment affected discoloration and metmyoglobin formation in ground beef patties. LED lighting may lead to increased meat quality shelf life in a retail setting.

Articles were edited for length and style.



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