

Beef Cattle Research Update

United States Department of Agriculture, University of Arkansas, and County Governments Cooperating

Eye White Percentage as a Predictor of Temperament in Beef Cattle

(Core et al., University of Guelph, Guelph)

What's Inside

Page	Topic
2	• An evaluation of bovine respiratory disease complex in feedlot cattle: Impact on performance and carcass traits using treatment records and lung lesion scores
3	• Performance and carcass traits of finishing heifers fed crude glycerin • Growth implants reduced tenderness of steaks from steers and heifers with different genetic potentials for growth and marbling
4	• Mother's milk

Accurately evaluating and selecting for calm temperament in beef cattle is important for economic and animal welfare reasons. Previous studies have shown that eye white can be a predictor of a multitude of emotions across different situations, but there is little research on the relationship between eye white and temperament. The objective of this experiment was to assess the accuracy and reliability of using the percentage of exposed eye white as a predictor of temperament in beef cattle. Forty-eight heifers, 39 bulls and 60 steers were video-recorded while in a squeeze chute, and two still digital images from each animal were selected for eye white determination. Chute temperament scores were assigned: 1 (calm) to 5 (agitated). Flight speeds were measured blindly and independently during a subsequent test where the amount of time it took a solitary animal to pass a handler and travel a specified distance was recorded. Eye white area was expressed as the

percentage of exposed eye area. Each image was analyzed twice to determine tracing repeatability.

- The mean percentages of eye white were 30.1%, 31.4% and 28.6% for the heifers, bulls and steers, respectively.
- The correlation coefficients for eye white percentage and chute temperament scores were 0.67, 0.95 and 0.70 for the heifers, bulls and steers, respectively.
- The correlations between eye white and flight speeds were 0.42, 0.33 and 0.29 for the heifers, bulls and steers, respectively.

Results from this study indicate that percent for the heifers, bulls and steers, respectively, could be used as a quantitative tool with minimal equipment to assess temperament in beef cattle, providing an objective method for temperament selection.

Effects of Early Gestational Undernutrition on Fetal Growth, Organ Development and Placentomal Composition in the Bovine

(Long et al., University of Wyoming, North Dakota State University and University of Texas Health Sciences Center)

Fetal intra-uterine growth restriction is known to negatively impact offspring health postnatally. This study evaluated the impacts of early gestational undernutrition followed by realimentation on bovine

fetal and placentomal growth. Thirty multiparous beef cows bred to a single sire and gestating female fetuses were fed either to meet NRC recommendations (control) or fed below NRC recommendations (nutrient restricted)

*Arkansas Is
Our Campus*

Visit our web site at:
<http://www.uaex.edu>

from day 30 to 125 of gestation. On day 125 of gestation, 10 control and 10 nutrient-restricted cows were necropsied. The remaining five nutrient-restricted cows were realimented to achieve similar body weight and body condition score with the remaining five control cows by day 190 of gestation; both groups were necropsied at day 245 of gestation.

- Fetal weight at day 125 of gestation was 2.1 lb for control cows; however, fetal weights of nutrient-restricted cows fell into two distinct groups: nutrient-restricted cows with fetal weights similar to controls (2.1 lb) and fetal weights of nutrient-restricted cows that were reduced (1.7 lb).
- Fetal brain weight as a percentage of fetal weight was increased (~11%) in the nutrient-restricted reduced fetuses weight group compared to fetuses from control cows and nutrient-restricted cows with fetal weights similar to controls, which were similar.
- Fetal heart weight as a percentage of fetal weight also tended to be increased (~10%) in the nutrient-restricted reduced fetuses weight group compared to control fetuses.

- The nutrient-restricted reduced fetuses weight group exhibited reduced cotyledonary weights compared to nutrient-restricted cows with fetal weights similar to controls and control cows (0.42 vs. 0.68, and 0.74 lb, respectively).
- On day 245 of gestation, fetal weights and caruncle weight were similar for nutrient-restricted and control cows; cotyledonary weights, however, were reduced in nutrient-restricted vs. control cows (3.2 vs. 4.7 lb).

Decreased fetal growth in nutrient-restricted cows on day 125 of gestation was associated with decreased cotyledonary weights and reduced placentomal surface areas. The return of nutrient-restricted cows to a body weight and body condition scores similar to that of control cows through realimentation beginning on day 126 resulted in similar fetal weights of nutrient-restricted and control cows by day 245 of gestation. Thus, a bout of fetal intra-uterine growth restriction may go undetected if cows undernourished during early gestation receive feed supplementation in the second half of gestation to assure normal birth weight.

An Evaluation of Bovine Respiratory Disease Complex in Feedlot Cattle: Impact on Performance and Carcass Traits Using Treatment Records and Lung Lesion Scores

(Schneider et al., Iowa State University)

The objective of this study was to investigate the effects of bovine respiratory disease (BRD) complex on economically important production traits with the use of health records in combination with lung lesion scores obtained at harvest. Records from 5,976 animals were used in this study from cattle that were managed in Midwestern feedlots. Average daily gain for three different feeding periods (acclimation, on-test and overall test) along with final body weight was evaluated as performance measures. Hot carcass weight, longissimus muscle area, subcutaneous fat cover and marbling score were collected at harvest. All calves were monitored by experienced feedlot personnel and treated according to the specific health protocol of each feedlot.

- Incidence of BRD was observed at a rate of 8.2%, and lung lesions at harvest were present in 61.9% of cattle from a sub population (n = 1,665).
- From this group of cattle, the overall incidence of BRD, defined as incidence of BRD and/or

cattle with lung lesions at the packing plant, was 64.4%.

- Incidence of BRD in the feedlot decreased average daily gain during both the acclimation period (0.82 lb) and the overall test period (0.15 lb).
- Incidence of BRD also had significant effects on HCW and marbling score with reduction of 18 lb and 0.13, respectively, in treated cattle.

The adverse effects on production traits tended to increase as the number of treatments increased. Potential decrease in performance and carcass merit observed in this study were associated with a decline of \$23.23, \$30.15 and \$54.01 in carcass value when comparing cattle never treated to cattle treated once, twice or three or more times, respectively. The presence of lung lesions did not have a significant effect on any of the traits; however, there was an association between the presence of active bronchial lymph nodes and lower productivity of feedlot cattle.

Performance and Carcass Traits of Finishing Heifers Fed Crude Glycerin

(Parsons et al., Kansas State University)

Crossbred heifers (930 lb) were fed finishing diets containing 0, 2, 4, 8, 12 or 16% crude glycerin (DM basis). Diets consisted of steam-flaked corn with 6% alfalfa hay and 1.2% urea and provided 300 mg of monensin, 90 mg of tylosin and 0.5 mg of melengestrol acetate per animal daily. Cattle were transitioned from the control diet to diets containing increasing proportions of glycerin over a period of 10 days. Cattle had ad libitum access to feed, and diets were delivered once daily throughout the 85-day trial period.

- As the concentration of glycerin increased, dry matter intake decreased linearly. Heifers fed 0, 2, 4, 8, 12 and 16% glycerin had average daily gain of 2.62, 2.95, 2.84, 2.76, 2.58 and 2.34 lb, respectively.
- Gain to feed ratio was optimal when glycerin was fed at 2% of the diet.
- Glycerin increased the final body weight by 28, 18 and 12 lb when fed at 2, 4 and 8% of the diet,

respectively, but reduced the final body weight by 4 and 32 lb when included at 12 and 16% of the diet.

- Similarly, hot carcass weight increased by 18, 11 and 7 lb when glycerin was fed at 2, 4 and 8% of the diet, respectively, but were 3 and 20 lb less than controls when glycerin was fed at 12 and 16%, respectively.
- Longissimus muscle area decreased linearly as glycerin concentrations increased and feeding glycerin resulted in linear decreases in subcutaneous fat over the 12th rib and marbling scores.
- Glycerin tended to decrease the percentage of cattle grading USDA Choice and increase the percentage of cattle grading USDA Select.

Adding glycerin to cattle-finishing diets improved BW gain and feed efficiency, particularly when added at concentrations of 8% or less on a DM basis.

Growth Implants Reduced Tenderness of Steaks From Steers and Heifers With Different Genetic Potentials for Growth and Marbling¹

(Boles et al., Montana State University and Northern Agricultural Research Center, Fort Circle, Havre, MT)

The objective of this study was to evaluate the effect of growth implants on the carcass characteristics and tenderness of steers and heifers with different genetic potentials for growth, lean meat yield production and marbling. Two experiments were conducted. Experiment 1 evaluated Angus steers sired by bulls with high EPD for retail product yield or marbling. Implant treatment was imposed randomly within sire groups. Loins were collected from each carcass and cut into three 2.54-cm steaks aged for 7, 14 and 21 days to evaluate tenderness. The second experiment evaluated steers and heifers of British and Continental breed descent. Steers and heifers were slaughtered after 120 days on feed. Loin sections were collected, and one 2.54-cm steak aged 7 days was used for tenderness analysis.

- When implants were used in Angus steers, hot carcass weight and longissimus muscle area increased, whereas internal fat and marbling decreased.

- In Angus steers, sire type did not affect shear force values of steaks; however, implant use significantly increased (less tender) shear force values.
- Carcasses from cattle of Continental breed descent were significantly heavier than carcasses of British breed descent with larger longissimus muscle area, slightly less fat and a reduced yield grade.
- Also, steer carcasses were heavier than heifer carcasses with larger longissimus muscle, but no effect of sex on fat depth, internal fat, yield grade or marbling was observed.
- No significant interactions were seen between growth implant and breed or between growth implant and sex for shear force values.
- Shear force values were significantly less (more tender) for steaks from steers and heifers of British descent compared with steers and heifers of Continental descent.

- Steaks from implanted steers and heifers had significantly greater shear force values than steaks from steers and heifers not implanted.

Use of growth implants in growing cattle resulted in significantly heavier carcass weights, larger longissimus muscle area and reduced internal fat. However,

implant use also reduced the amount of marbling along with contributing to reduced tenderness. Complicating the tenderness issue are the increased shear force values reported for heifers as well as steers of Continental breed descent. Use of implants may contribute to tenderness variability because of different animal responses to implants.

Mother's Milk

(Culinology, December 2008)

In September, acting out of concern for the suffering of dairy cows, PETA sent Ben & Jerry's co-founders Ben Cohen and Jerry Greenfield a formal request to replace cow's milk in their ice cream with

human breast milk. The company respectfully declined, saying: "We applaud PETA's novel approach to bringing attention to an issue, but we believe a mother's milk is best used for her child."



Tom R. Troxel
Professor and Associate Department
Head - Animal Science

The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Arkansas Cooperative Extension Service is implied.