

# Beef Cattle Research Update

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

## What's Inside

Page	Topic
2	• Using Corn Stover and Dried Distillers Grains With Solubles to Conserve Stockpiled Forages and Improve Reproductive Performance and Progeny Growth in Fall-Calving Beef Cows
	• Evaluation of Using Half-Sibling Beef Cows to Increase Growth and Carcass Uniformity of Calf Crops
3	• Evaluation of Prior Grazing Experience on Reproductive Performance in Beef Heifers
	• Effects of Energy Supplementation Frequency and Forage Quality on Performance, Reproductive and Physiological Responses of Replacement Beef Heifers
4	• Additive Effects of Growth-Promoting Technologies on Performance of Grazing Steers and Economics of the Wheat Pasture Enterprise
5	• The Effect of Bermudagrass Hybrid on Forage Characteristics, Animal Performance and Grazing Behavior of Beef Steers

## Forty-Three Percent of Food Budget Spent on Food Away From Home

(Mary Soukup, Editor, Drovers CattleNetwork)

In the 35 years from 1977 to 2012, the average American household budget spent on food away from home increased from 30% to 43% and about one-third of all calories consumed, according to the latest U.S. Department of Agriculture's Economic Research Service Quarterly Food-Away-From-Home Prices data report. The study tracks food prices at four types of food away from home establishments, including full- and limited-service restaurants, vending machines and schools and divides price by census regions and divisions.

According to USDA, given the growing prevalence of food consumed away from one's home, the agency says this data may be able to help study how food prices affect demand for different products and, consequently, nutrition and health outcomes. While the agency says multiple studies have been conducted in the past to look at the role of food-at-home prices on purchasing behavior and dietary outcomes, similar studies have been difficult in the past for food away from home due to limited price information.

- From 1998 to 2004, the price at full-service restaurants across the country increased

but then decreased in 2005. The study reports that prices were flat during the recession in 2000 to 2009 but have risen again since 2010. On average, prices at full-service restaurants were highest in the Northeast and increased in that region from \$7.25 to \$10.10, or 2.45%, from 1998 to 2012. Prices were lowest in the South, increasing from \$5.69 to \$9.54, or 3.62%, during the same time period.

- Limited-service restaurants were, on average, one-third of the price of full-service restaurants. Sandwiches were the most expensive category, averaging \$6.74 in the Northeast in 2012, while Mexican food was the least expensive, averaging \$3.27 in the Northeast in 2012. According to the study, hamburgers were the only category within limited-service restaurants that did not decrease in price during the recession.
- School lunch prices were also part of the study, and USDA reports they varied less across the country than full- or limited-service restaurants. However, school lunch prices increased more on average than the other categories,

*Arkansas Is  
Our Campus*

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

increasing more than 5% in the Northeast between 1998 and 2012. Nationwide, school lunch prices increased between 3% and 5% during that time.

- While food prices at vending machines were the lowest of the categories studied, they increased the most overall, between 4% and 8%, from 1998 to 2012.

## Using Corn Stover and Dried Distillers Grains With Solubles to Conserve Stockpiled Forages and Improve Reproductive Performance and Progeny Growth in Fall-Calving Beef Cows

(Gunn et al., Purdue University and University of Minnesota)  
*The Professional Animal Scientist* 30(2014):215-224

Angus-cross, fall-calving beef cows (n = 153) were used in this experiment. The objective was to determine whether incorporating a period of corn stover and dried distiller grains with solubles feeding into a preexisting nutritional program that included grazing stockpiled tall fescue affects reproductive performance and progeny growth. On Julian day 267, cows were stratified and allotted by body weight, body condition scores and calving date (if calved) to receive one of two isocaloric dietary treatments through timed AI: stockpiled tall fescue or corn stover plus dried distillers grains with solubles (0.7% of body weight/day). Following timed AI, stockpiled tall fescue cows were fed grass hay, and corn stover plus dried distiller grains with solubles cows were placed on stockpiled tall fescue until grass was exhausted and then fed grass hay.

- Cow body weight and body condition scores did not differ during the supplementation period.
- The proportion of cows cycling at breeding-season initiation tended to be greater in

stockpiled tall fescue (92.2%) than in corn stover plus dried distiller grains with solubles-treated (80.6%) cows.

- Pregnancy rates from timed AI did not differ between the stockpiled tall fescue (42.4%) and corn stover plus dried distiller grains with solubles (50.0%) treatment. However, breeding-season pregnancy rates were greater in the corn stover plus dried distiller grains with solubles (89.6%) than stockpiled tall fescue (74.2%) treatment.
- Progeny from cows fed corn stover plus dried distiller grains with solubles were heavier at 62 days of age and at weaning when compared with stockpiled tall fescue progeny.

In summary, including a dietary period of corn stover and dried distiller grains with solubles to a traditional management practice of grazing stockpiled tall fescue and feeding hay resulted in greater breeding-season pregnancy rates and heavier progeny.

## Evaluation of Using Half-Sibling Beef Cows to Increase Growth and Carcass Uniformity of Calf Crops

(Nichols et al., The Samuel Roberts Noble Foundation, Ardmore, Oklahoma)  
*The Professional Animal Scientist* 30(2014):37-42

Uniformity of growth and carcass traits of calves resulting from commercial beef cows that were either half-siblings or similar phenotype but unknown genetic relationship were determined over 5 calf crops.

- Adjusted weaning-weight standard deviation was not different between cow groups (49.4 and 47.6 lb for half-siblings and unknown genetic relationship cows, respectively).

- Lifetime weaning-weight production standard deviation was 705.6 lb for half-sibling cows and 710.0 lb for unknown genetic relationship cows.
- Healthy calves from each year were finished in a commercial feedlot. Standard deviation of hot carcass weight, LM area, and LM area per unit of hot carcass weight of calves from half-sibling cows tended to be less than standard deviation of calves from unknown

genetic relationship cows, whereas finishing-period average daily gain tended to be greater.

Observed differences in calf-trait standard deviation were small (approximately 1.5%) and overall were similar to expectations calculated from quantitative genetics theory. However, observed differences in standard deviation fluctuated widely from expectations for any given trait,

indicating that very large samples may be needed to reliably observe the small differences that are expected. Therefore, preferentially selecting commercial beef cows so that they have half-sibling genetic relationships, over and above phenotypic selection criteria, appears to have limited ability to reduce phenotypic variability of calf crops, especially for traits with low heritabilities.

## Evaluation of Prior Grazing Experience on Reproductive Performance in Beef Heifers

(Perry et al., South Dakota State University, and Padlock Ranch Company, Ranchester, Wyoming)  
*The Professional Animal Scientist* 29(2013):595-600

An important part of any production system is the reproductive performance associated with replacement heifers. In the majority of beef operations, heifers are moved to a drylot for a period of time to be weaned and then must again be moved to a forage grazing situation. Therefore, experiments were conducted to determine whether previous grazing experience affected performance and conception rates.

In Exp. 1, beef heifers were moved to a forage grazing situation and supplemented with dried distillers grains plus solubles after a 44-day weaning period in the drylot ( $n = 33$ ) or remained in a drylot and fed hay and supplement but were moved to a forage grazing situation 27 days before the start of the breeding season ( $n = 32$ ).

In Exp. 2, beef heifers were moved to a forage grazing situation before the breeding season ( $n = 207$ ) or were moved to a forage grazing situation immediately following AI ( $n = 214$ ).

- In Exp. 1, moved to a forage grazing situation after weaning lost 3.5 lb/day for the first week they were turned to grass compared with the heifer remaining in the drylot gained 1.94 lb/day. This resulted in a linear body weight gain among drylot heifers and a quadratic body weight gain among forage grazed heifers.
- In Exp. 2, the heifers moved to the forage grazing situation before the breeding season had increased average dairy gain (1.28 lb/day) from AI to pregnancy diagnosis and more became pregnant to AI (59.4%) compared with heifers that were moved to a forage situation immediately following AI (0.46 lb/day and 49.1%).

In summary, transitioning heifers to pasture resulted in body weight loss during the first week after movement, and if this transition occurred immediately following AI, pregnancy success to AI was reduced.

## Effects of Energy Supplementation Frequency and Forage Quality on Performance, Reproductive and Physiological Responses of Replacement Beef Heifers

(Moriel et al., University of Florida and Oregon State University)  
*J. Anim. Sci.* 2012.90:2371-2380

The objective of this study was to compare performance, physiological and reproductive responses of beef heifers consuming forages differing in nutritional quality and offered a low-starch energy supplement at two different frequencies. Forty-eight Brahman  $\times$  British

heifers (initial age = 294 days) were allocated into 1 of 16 drylot pens (3 heifers/pen) which were randomly assigned to receive, in a  $2 \times 2$  factorial arrangement of treatments: 1) low-quality hay (stargrass with 8% CP and 81% NDF, dry matter basis) and daily supplementation; 2) stargrass

and supplementation three times weekly; 3) medium-quality hay (bermudagrass with 12% CP and 74% NDF, DM basis) and daily supplementation; and 4) bermudagrass and supplementation three times weekly. Throughout the study (day 0 to 120), hay was offered in amounts to ensure *ad libitum* access, and a supplement based on soybean hulls and wheat middlings was offered at weekly rates of 34.8 and 17.4 lb/heifer (dry matter basis) for low-quality hay and medium-quality hay, respectively. Forage and total dry matter intake were evaluated daily, from day 20 to 26, day 34 to 40 and day 48 to 54. Blood samples were collected weekly for determination of plasma progesterone to evaluate puberty attainment. On day 60, heifers were reallocated by treatment into four paddocks and exposed to Angus bulls (1:12 bull:heifer ratio) until day 120. Date of conception was estimated retrospectively

by subtracting gestation length (286 days) from the calving date.

- Heifers receiving medium-quality hay and daily supplementation had similar average daily gain compared with supplementation three times weekly (0.60 vs. 0.55 lb/day).
- Attainment of puberty and pregnancy were hastened in daily supplemented heifers compared with supplementation three times weekly heifers (supplementation frequency  $\times$  week interaction).

Therefore, reproductive development of beef replacement heifers consuming diets based on low- and medium-quality forages are enhanced when low-starch energy supplements are offered daily instead of three times weekly.

## Additive Effects of Growth-Promoting Technologies on Performance of Grazing Steers and Economics of the Wheat Pasture Enterprise

(Beck et al., University of Arkansas, Elanco Animal Health Stocker District, Guthrie, Oklahoma, ADM Alliance Nutrition, Quincy, Illinois, and Lincoln University, Jefferson City, Missouri)  
*J. Anim. Sci.* 2014.92:1213-1227

This research was designed to evaluate the effect of monensin supplementation via mineral or pressed protein block with or without a growth-promoting implant on performance of steers grazing wheat pasture in Arkansas over two years. Preconditioned steers ( $n = 360$ , body weight = 525 lb) grazed fifteen 3.6-acre wheat pastures in the fall ( $n = 60$  steers each fall, stocking rate of 1.1 steers/acre) or thirty 1.8-acre wheat pastures in the spring ( $n = 120$  steers each spring, stocking rate of 2.2 steers/acre). Steers in each pasture were given free-choice access to nonmedicated mineral or were supplemented with monensin via mineral or pressed protein block. Additionally, one-half of the steers in each pasture were implanted with 40 mg trenbolone acetate and 8 mg estradiol (Component TE-G).

- There was no interaction between supplement treatment and growth-promoting implants,

and average daily gain for monensin mineral and monensin protein block were increased over nonmedicated mineral by 0.15 to 0.20 lb/day, respectively.

- Implanting steers with Component TE-G increased average daily gain by 0.31 lb/day.

The combination of these growth-promoting technologies is a cost-effective means of increasing beef production by 22% without increasing level of supplementation or pasture acreage. Utilizing ionophores and implants together for wheat pasture stocker cattle decreased cost of gain by 26%. Utilizing both implants and monensin increased net return by \$30 to \$54/steer for monensin mineral or \$18 to \$43/steer for monensin protein block compared with nonmedicated mineral at low and high values of body weight gain, respectively.

## The Effect of Bermudagrass Hybrid on Forage Characteristics, Animal Performance and Grazing Behavior of Beef Steers

(Scaglia and Boland, Louisiana State University and Mississippi State University)

*J. Anim. Sci.* 2014.92:1228-1238

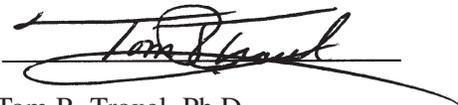
Bermudagrass is a major feed source for ruminants across the southeastern United States. In four consecutive years, three different bermudagrass hybrids – Alicia, Jiggs, and Tifton-85 – were evaluated under a low stocking rate as forage and hay sources. The nutritive value, *in situ* DM digestibility, and performance and grazing behavior of beef steers under similar management were evaluated.

- Sampling day had an effect on all forage variables. Percentages of CP and TDN decreased while concentration of ADF, NDF, lignin and nonfiber carbohydrates increased as grazing season advanced.
- Alicia had lower nutritive value, showing greater lignin (5.3%) and indigestible fraction (44.9%) compared to Jiggs (4.9% and 35.6%, respectively) and Tifton-85 (4.5% and 40.1%, respectively). Tifton-85 contained the lowest concentration of nonfiber carbohydrates (11.8%).
- Steers grazing Jiggs and Tifton-85 had greater average daily gain (1.12 lb and 1.21 lb, respectively) and body weight gain per acre (230 lb and 249 lb, respectively) than those on Alicia (0.79 lb and 164 lb/acre, respectively);

results that are probably explained by the lower nutritive value characteristics of the latter.

- Most grazing behavior variables were affected by time of the day and grazing period. Two major grazing events were observed at dawn and dusk. Grazing time (32 min) was lowest while standing (140 min) and lying (98 min) time were greater from 1100 to 1559 hour, probably as an effect of temperature and humidity at that time of the day.
- During summer, the temperature humidity index is above 72 (mild heat load) for the entire season and above 79 (severe heat load) during most of the daylight hours from June to August.

Heat load likely affected animal performance and grazing behavior; however, some characteristics associated with these bermudagrass hybrids, especially with Alicia, such as its percentages of lignin and indigestible fraction, may also partially explain the poor animal performance. In the conditions of the study, environmental variables (temperature and humidity), as well as the type of bermudagrass hybrid, affected animal performance and grazing behavior of recently weaned beef steers.



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