



# Beef Tips

March 2016

Department of Animal Sciences & Industry

[www.asi.ksu.edu/beeftips](http://www.asi.ksu.edu/beeftips)

## Upcoming Events

### Cattlemen's Day

March 4, 2016  
Manhattan, KS  
[www.KSUBeef.com](http://www.KSUBeef.com)

### Beef Improvement Federation Annual Convention

June 14–17, 2016  
Manhattan, KS  
See details page 6

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## *High protein diets and reproduction*

*Sandy Johnson, livestock specialist*

Anecdotal reports have been made concerning lowered fertility in beef cows and heifers bred on lush forage such as wheat pasture. Relatively high concentrations of crude protein in the wheat have been accepted as the cause for lowered fertility, primarily based on observations in dairy cows. However, it is often difficult to rule out other possible causes of lower fertility in these cases. Further examination of the literature shows differential effects of high protein diets in dairy and beef cows.

A study at the Ag Research Center in Hays compared fertility of cows bred on native pasture or wheat pasture over a five-year period. The average wheat grazing period was April 11 to June 11 with breeding beginning between May 15 and 20<sup>th</sup>. Free choice sorghum-sudan hay was available to wheat pasture cows the first two weeks of grazing. Neither AI pregnancy rate nor final pregnancy rate differed among cows bred on native pasture or wheat pasture.

Additionally, scientists at Oklahoma State University found no difference in pregnancy rates between yearling beef heifers bred on wheat pasture or in a drylot. This was despite the fact blood urea nitrogen concentrations were 22 mg/dL two days before breeding in wheat pasture heifers and wheat contained 26-27% crude protein.

Lactating dairy cows typically receive diets containing 17 to 19% crude protein during early lactation which stimulates and supports high milk production. When excess protein is present in the diet, urea concentration in the blood stream increases. Measurements of blood urea nitrogen (BUN) or milk urea nitrogen (MUN) have been used to monitor overall protein metabolism in cows.

Pregnancy rates were reduced when concentrations of plasma urea nitrogen or milk urea nitrogen were greater than 19 mg/dL.

While considerable evidence supports the negative impacts of high protein diets in dairy cattle, some studies have reported no impact. In beef cattle, positive effects of high protein diets on pregnancy rates have been reported.

Several mechanisms have been proposed that would explain some of the discrepancies in the impacts of high crude protein diets on reproductive performance. Protein sources vary in the amount of dietary protein that is rumen degraded protein (RDP) and rumen undegraded protein (RUP). A certain amount of degradable protein is used by rumen microbes to make microbial protein. When dry matter intake is low, more protein is degraded in the rumen because of the slower rate of passage. In the case of high dry matter intake, rate of passage is increased and less protein is degraded in the rumen. Adding more RUP may increase the amount of protein available in the small intestine.

High producing dairy cows often suffer from a negative energy balance during early lactation. The effects of high dietary protein interact with the negative energy balance. More energy is required to metabolize any excess protein. When energy is needed for reproduction, this additional demand to handle excess protein may limit energy for reproduction. If metabolizable energy requirements are met, excess crude protein may be beneficial to reproduction.

Ethanol co-products such as distillers grains and corn gluten meal have become cost effective protein and energy supplements and

*Continued ..... see Protein on page 6*



## 2016 Cattlemen's Day Research Summaries

Complete reports of these and other studies at [newprairiepress.org/kaesrr/](http://newprairiepress.org/kaesrr/)

### Premium Choice Steaks Purchased from Grocery Outlets Are Generally More Tender Throughout the Year than Lower Quality Grade Steaks

A. M. Collins, J. A. Unruh, T. A. Houser, and S. Stroda

**Objective:** The purpose of this study was to determine tenderness and cooking characteristics of strip steaks purchased from self-serve display cases in grocery store outlets throughout the year.

**Study Description:** Six strip steak types (n = 311 steaks) were purchased weekly for a year from four local grocery stores. Steaks included two different types of branded Premium Choice, Premium Choice, Choice, Non-grade Specified, and branded Natural. The day following the purchase, physical measurements were taken on steaks. Steaks were then cooked to an internal temperature of 158°F using a convection oven and refrigerated. The following day steaks were cored and sheared (Warner-Bratzler shear force).

#### Percentage of six steak types meeting different Warner-Bratzler shear force thresholds for very tender, tender and intermediate tenderness.

Steak type	n	Very tender <sup>1</sup>	Tender <sup>1</sup>	Intermediate <sup>1</sup>
Branded Premium Choice, store A	51	66.7	90.2	100
Branded Premium Choice, store B	52	51.9	84.6	98.1
Premium Choice, store C	52	51.9	94.2	100
High marbling: Choice, store B	155	56.8	89.7	99.4
Non-grade specified, store C	52	44.2	65.4	86.5
Branded natural, store D	52	40.4	71.2	86.5
Average marbling:	52	38.5	67.3	94.2
All steaks	156	41	67.9	91.7
All steaks	311	48.9	78.8	95.5

<sup>1</sup>Warner-Bratzler shear force thresholds of 7.1, 8.6, and 10.1 lb were used to indicate very tender, tender, and intermediate steaks, respectively.

**The Bottom Line:** Higher quality strip steaks generally have greater amounts of marbling, are more tender (smaller shear force), and are more consistent in tenderness throughout the year than lower quality grade steaks.

### Effects of Intensive Late-Season Sheep Grazing Following Early-Season Steer Grazing on Population Dynamics of *Sericea Lespedeza* in the Kansas Flint Hills

J. Lemmon, W. H. Fick, J. A. Alexander, G. W. Preedy, C. A. Gurule, and K C. Olson

**Objective:** Our objective was to evaluate the effects of late-season sheep grazing following locally conventional steer grazing on vigor and reproductive capabilities of *sericea lespedeza* (SL).

**Study Description:** We used eight 80-acre pastures that were assigned randomly to one of two treatments: early-season grazing with beef steers from April 15 to July 15 followed by rest for the remainder of the year, or steer grazing from April 15 to July 15 followed by intensive grazing by mature ewes. Ewes were assigned randomly to graze one of four pastures; remaining pastures were not grazed from August 1 to October 1.

Item	Steer grazing only	Steer + sheep grazing	P-Value
Total seed weight, mg/plant	712.1	90.9	≤ 0.01
Seeds, no./plant	548.0	69.9	≤ 0.01

<sup>a</sup>Treatment x time ( $P < 0.01$ ).

**The Bottom Line:** Late-season, intensive sheep grazing on native tallgrass prairie decreased vigor and reproductive capabilities of SL. Sheep appeared to preferentially select SL, whereas steers avoided it. Late-season sheep grazing decreased forage biomass by 953 lb dry matter per acre compared with late-season rest; however, residual biomass on pastures grazed during the late growing season was sufficient to prevent soil-moisture loss and erosion during the dormant season.

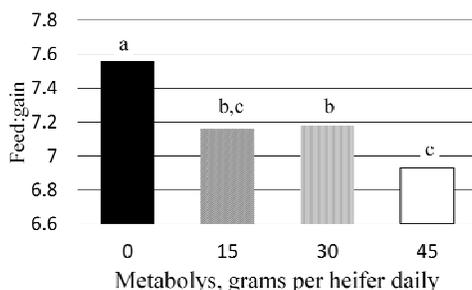
## Ruminally-Protected Lysine (Metabolys®) Improves Performance of Growing Beef Cattle

V. A. Veloso, C. L. Van Bibber-Krueger, and J. S. Drouillard

**Objectives:** Synthetic lysine, while routinely added to pig diets, is ineffective in fulfilling lysine requirements of cattle due to extensive degradation by microbes within the rumen. Utilization of lysine can be improved by encapsulating with compounds, such as saturated fats, that minimize degradation by ruminal microbes. The purpose of this experiment was to measure the impact of Metabolys® (H.J. Baker & Bro. Inc., Tuscola, TX), an encapsulated form of lysine sulfate, on rate of gain and feed efficiency in backgrounding cattle.

**Study Description:** A total of 448 crossbred heifers (632 ± 31 lb initial body weight) were used in a 112-d growth trial. Heifers were blocked by body weight and randomly allotted to 64 concrete-surfaced pens, with seven animals assigned to each pen, and 16 pens for each of four dietary treatments that provided differing amounts of Metabolys. Diets contained (dry matter basis) 45% brome hay, 25% wet corn gluten feed, 25% steam-flaked corn, and 5% supplement. Supplements provided 0, 15, 30, or 45 grams per heifer daily of Metabolys. Heifers were fed once daily for 112 days.

**Results:** Daily feed intake decreased and average daily gain decreased linearly ( $P < 0.05$ ) with each incremental addition of Metabolys, thus improving feed:gain.



a,b,c Bars without common superscript differ,  $P < 0.05$

**The Bottom Line:** Feeding Metabolys, a ruminally protected lysine source, is an effective strategy for improving gain and feed efficiency of backgrounding cattle.

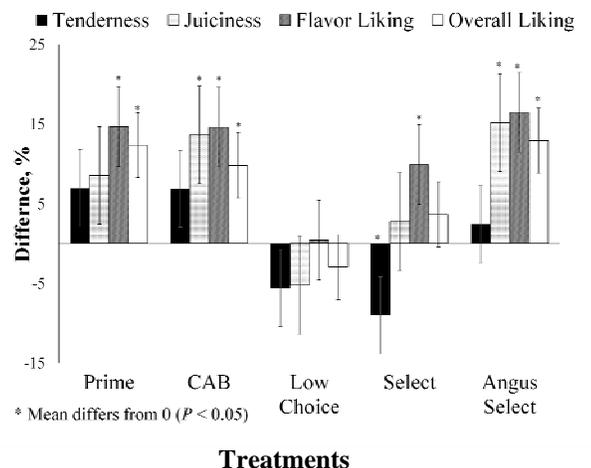
## Does Knowing Brand or USDA Grade of Beef Strip Steaks Affect Palatability for Consumers?

A. K. Wilfong, K. V. McKillip, J. M. Gonzalez, T. A. Houser, E. A. Boyle, J. A. Unruh, and T. G. O'Quinn

**Objective:** The objective of this study was to determine how consumer palatability ratings of beef strip loin steaks are affected when products are identified with a brand or USDA grade.

**Study Description:** Strip loins were selected to represent five quality levels - USDA Select, Choice, Prime, Certified Angus Beef (CAB; upper 2/3 Choice), and Select from phenotypical Angus cattle. Consumer panelists evaluated samples for tenderness, juiciness, flavor liking, and overall liking in two evaluation rounds—blind and non-blind testing. Additionally, consumers rated each palatability trait as either acceptable or unacceptable.

### Percent change in consumer rating of tenderness, juiciness, flavor and overall liking when brand was identified for five quality treatments



**Bottom Line:** Prime, CAB, and Angus Select products received increased ratings when brand was disclosed indicating a “brand lift,” while Choice and Select products received no benefit from brand disclosure; indicating the impact of branding and brand or grade perception on beef eating quality.

## Altering Supplementation Frequency During the Pre-Partum Period of Beef Cows Grazing Dormant Native Range

C. J. McMullen, J. R. Jaeger, K. R. Harmony, J. W. Waggoner, and K. C. Olson

**Objective:** Our objective was to evaluate the effect of altering supplementation frequency during late gestation on performance of spring-calving cows that are grazing low-quality native range.

**Experimental Procedures:** Pregnant Angus crossbred cows were maintained on dormant native range for 88 days until the onset of calving. Cows were assigned randomly to 1 of 4 treatments: 1) dried distiller's grains fed daily (D1); 2) dried distiller's grains fed once every 6 days (D6); 3) dried distiller's grains fed daily for the first 60 days and then once every 6 days for the remaining 28-day period (D1-D6); and 4) dried distiller's grains fed every 6 days for the first 60 days then daily for the remaining 28-day period (D6-D1).

**The Bottom Line:** For pregnant beef cows supplemented with dried distiller's grains, increasing supplementation frequency from once every 6 days to daily feeding for the 28 days prior to calving resulted in less weight gain and poorer body condition score.

Item	Supplement treatments				SEM	P-Value		
	D1	D6	D1-D-6	D6-D1		Treatment	Year	Treatment x Year
Number of cows	57	65	57	59				
Body weight change, lb								
days 1-60	84.9 <sup>c</sup>	73.3 <sup>c,d</sup>	84.5 <sup>c</sup>	70.0 <sup>d,e</sup>	2.82	0.08	<0.01	0.65
days 60-88	26.2 <sup>a</sup>	27.3 <sup>a</sup>	19.4 <sup>a,b</sup>	10.3 <sup>b</sup>	2.07	0.03	0.53	0.07
days 1-88	111.8 <sup>a</sup>	101.2 <sup>a</sup>	105.0 <sup>a</sup>	81.2 <sup>b</sup>	3.23	<0.01	<0.01	0.39
Body condition score <sup>1</sup>								
day 1	5.9	5.8	6.0	5.9	0.03	0.45	0.53	0.59
day 60	5.6	5.5	5.6	5.5	0.03	0.39	<0.01	0.89
day 88	5.8 <sup>c</sup>	5.8 <sup>c</sup>	5.8 <sup>c</sup>	5.6 <sup>d</sup>	0.03	0.09	<0.01	0.75

<sup>1</sup>Scale of 1 to 9; 1 = extremely emaciated, 9 = extremely obese (Wagner et al., 1988).

<sup>a,b</sup>Means with different superscripts denote difference between treatments ( $P < 0.05$ ).

<sup>c,d,e</sup>Means with different superscripts denote a tendency for difference between treatments ( $0.05 < P \leq 0.10$ )

## Plan now to attend the “Progress on the Prairie” Beef Improvement Federation Convention, June 14-17, 2016, Manhattan, Kansas

Preparations are being finalized for the 2016 Beef Improvement Federation Annual Meeting and Research Symposia titled “Progress on the Prairie.” The annual event will be held June 14-17, 2016 in Manhattan, Kansas and headquartered at the new Hilton Garden Inn and Conference Center. The BIF conference routinely draws in a large group of the leading seed stock and commercial beef producers, academics and allied industry partners. The attendance list is a who’s-who of the beef value chain offering great networking opportunities and conversations around the issues of the day. The program topics focus on how the beef industry can enhance value through genetic improvement across a range of attributes that affect the value chain.

The event features two and a half days of educational programming and a full day of tours visiting regional seed stock and commercial producers. The first morning’s general session is titled “Opportunities for the Beef Value Chain: Can we become more coordinated and more profitable?” and headlined with industry thought leaders including Drs. Ted Schroeder and Glynn Tonsor, Kansas State University; Dr. John Stika, Certified Angus Beef; Dr. Brad Morgan, Performance Food Group; and Dr. Keith Belk, Colorado State University. The second day’s general session is titled “Protecting producer profit for the future” and features nationally recognized speakers including Dr. David Lalman, Oklahoma State University; Mr. Chip Ramsay, Rex Ranch; Dr. Mark Enns, Colorado State University and Dr. Clay Mathis, King Ranch Institute for Ranch Management. Afternoons are filled with break-out sessions focusing on a range of beef production and genetic improvement topics. The conference also features a Young Producer Symposium designed to network and equip young cattle producers with essential knowledge as they grow their role in the business. With the program’s depth and breadth, there is something for everyone.

For more conference details including lodging information, full conference program and registration please see: <http://beefimprovement.org/library/registration-info> or contact Kansas State University hosts Bob Weaver, [bweaver@ksu.edu](mailto:bweaver@ksu.edu), 785-532-1460 or Lois Schreiner, [lschrein@ksu.edu](mailto:lschrein@ksu.edu), 785-532-1267.

## *Protein, continued from page 1*

their use may result in feeding protein in excess of NRC recommendations. Iowa State University scientists have been exploring the role of excess crude protein in beef cow reproduction.

In one Iowa State study, beef cows received isocaloric and isonitrogenous supplements composed of either a moderately high (corn gluten meal) or low (soybean meal) RUP source in addition to corn stalks ad libitum. Dominant follicle growth and ovulatory parameters were improved with the high RUP supplement. The soybean meal group (low RUP) had improved concentrations of progesterone post ovulation. A second study fed isocaloric supplements containing either .68 or 1.47 lb/d of corn gluten meal (.55 lb/d CP and 0.81 kg/d RUP vs 1.06 lb/d CP and 0.90 kg/d RUP, respectively) to dry, non-pregnant, mature beef cows with ad libitum access to corn stalks. The higher level of corn gluten meal resulted in a larger ovulatory follicle and more antral follicles. Further work is needed to understand the potential mechanisms involved and impacts on actual fertility.

In summary, while feeding excess amounts of crude protein to dairy cows often reduces reproductive performance the same has not been true for beef cows. This may be because the beef animal is much less likely to be in a negative energy balance when receiving a diet with excess crude protein. Additionally, protein supplements differ in the amount of RDP and RUP which may contribute to differential effects on reproduction.

While we still have much to learn, for now, producers feeding total crude protein in excess of 18% to beef cows prior to breeding should ensure energy requirements are met. Diets above that level might benefit from consultation with a nutritionist. In the case of lush cereal grain pasture, providing additional dry forage to slow rate of passage may be needed. Since wheat pasture may not last the entire breeding season, keep in mind other possible causes of lower pregnancy rates related to wheat pasture management. Reduced forage availability could reduce total energy intake. Reduced energy status and/or stress from moving to a new location after wheat pasture could stop females from cycling or cause embryonic loss.