



CATTLEMEN'S DAY 2013

BEEF CATTLE RESEARCH

REPORT OF PROGRESS 1083



Kansas State University Agricultural Experiment Station and Cooperative Extension Service

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Celebrating the career and retirement of Dr. Michael E. Dikeman



Michael earned his bachelor's degree in animal husbandry at Kansas State University in 1966, his master's degree in animal husbandry at Michigan State University in 1968, and his doctoral degree in food science at K-State in 1970. He was hired as faculty in the animal husbandry department at K-State in 1970 with a teaching and research appointment. He has taught 13 different courses. He cooperated on research projects with the U.S. Meat Animal Research Center (ARS, USDA) at Clay Center, NE, for 18 years.

Michael received numerous K-State, regional, and national awards for teaching, research, and advising, including the Distinguished Teaching Award and the Distinguished Research Award from the American Meat Science Association and a National Association of State Universities and Land Grant Colleges (NASULGC) Food and Agricultural Sciences Excellence in College and University Teaching Award. He served as advisor to Block & Bridle (15 years), Ag Student Council (7 years), and Alpha Zeta (2 years). He was selected as the K-State Outstanding Student Club Advisor Award in 2002. He served three years as a K-State Ombudsperson.

Michael's research focused on the interface between beef cattle production/genetics and carcass composition, meat tenderness, and meat cookery. He was co-investigator on an extensive inter-university "Carcass Merit Traits" tenderness project resulting in three cattle breed associations publishing Expected Progeny Differences for tenderness. He and his 37 graduate students published more than 425 journal articles, technical reports, abstracts, and conference papers, and he co-edited the first Meat Science Encyclopedia. He has made invited presentations at international conferences. Michael served as president of the American Meat Science Association, president of the Federation of American Societies of Food Animal Sciences, and secretary of the American Society of Animal Science.

Upon retirement, Michael will continue to enjoy raising Simmental cattle with his Border Collie, Sugar's, help. He will remain active in First Baptist Church and the Gideons and will continue to cheer on the Wildcats.

We thank Michael for his many years of service to our department and university and wish him a long and happy retirement.

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Genetic Selection, Management, and Technology Can Efficiently Increase Productivity, Meat Yield, and Beef Quality

Michael Dikeman

Objective: Evaluate the benefits of genetic selection, improved management, and technology to improve efficiency, productivity, meat yield, and meat quality of cattle.

Study Description: An extensive assimilation, review, and interpretation of research literature, technical bulletins, trade articles, and industry trends was conducted to reveal the combined and/or integrated benefits of improved genetics, improved management, and optimum use of technology to improve production efficiency, meat yield, and meat quality of cattle.

Results: Drought and its long-term effects, including high prices of feeder and fed cattle, make it more difficult for producers to decide whether to retain more heifers to increase cow numbers. Demand for high-quality beef actually increased during the recent economic recession, which provides incentive for significant expansion if more herds produce more Premium Choice beef. There could be 3 to 4 million more beef cows by 2018 if ranchers were to rebuild herds with cattle that produce beef for high-quality markets. That could mean a 10% increase in overall demand for beef and long-term expansion of ≈ 6 million cattle. Retail beef reached a record high price of \$5.09/lb in January of 2012, which could have adverse short-term and long-term effects on beef demand. High unemployment, the recession, and higher food prices have strained consumers' budgets. A significant proportion of consumers have or will shift away from beef, particularly rib and loin cuts, because of high retail prices, and they likely will be slow to come back to beef.

Beef produced per animal in the U.S. has increased approximately 30% in the past 35 years, whereas land use by cattle has decreased 33%, but the industry is still producing too much waste fat. Carcasses with a high yield grade 3 average approximately 24% fat trim. Major Premium Choice beef programs now allow yield grade 4 carcasses (about 28% fat trim) to ensure adequate supply of product. In many instances, beef cattle breeders and/or breeds have failed to make genetic improvements for meat yield and marbling; consequently, a significant proportion of cattle are fed to excessive fatness to attain Choice or Prime grades. Genetic improvement in marbling is an alternative. Sires are available for several breeds that excel in marbling, ribeye area, and fat thickness expected progeny differences (EPDs); even tenderness EPDs are now published for a few breeds. Implants are one of our most economically viable technologies, but aggressive or improper use of implants can decrease marbling and tenderness. A final problem is lack of control over aging periods employed by retailers.

The Bottom Line: The beef cattle industry will enjoy great opportunity in the coming years if greater attention is given to genetically improving production efficiency, effectively utilizing technology, and providing high-quality beef without feeding cattle to high levels of fatness.

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Insecticide Ear Tags Improve Grazing Cattle Performance

Dale Blasi

Objective: To determine the efficacy of insecticide ear tags for improving growth of stocker calves grazing native pasture in the Flint Hills region of Kansas.

Study Description: A 77-day grazing study was initiated at the Kansas State University Beef Stocker Unit on April 24, 2012. All steers were completely randomized to grazing treatments. Steers were assigned to three treatments with four pasture replicates per treatment. The treatments included a Control group (no ear tags applied), a group that received a single insecticide tag in one ear (One), and a third group that received and insecticide ear tags in both ears (Two).

Results: Gain and final weight in calves that received the insecticide ear tags were numerically greater than controls, but these differences were not statistically significant ($P > 0.83$). Due to the drought conditions, we were forced to terminate the grazing season prematurely, potentially limiting the cumulative beneficial effects of the insecticide ear tags. This factor, combined with the limited numbers of cattle used in the study, may have restricted our ability to detect significant differences among treatments.

Performance of grazing cattle tagged with 0 (Control), one, or two insecticide-impregnated ear tags

Treatment	Control	One	Two
On test weight, lb	679	679	679
Off test weight, lb	789	798	801
Average daily gain, lb/day	1.45 ± 0.14	1.53 ± 0.14	1.58 ± 0.14
Added gain relative to control group, lb	—	9	12

The Bottom Line: Using insecticide ear tags yielded substantial improvements in gain over the 77-day grazing season, but these improvements were not statistically significant.



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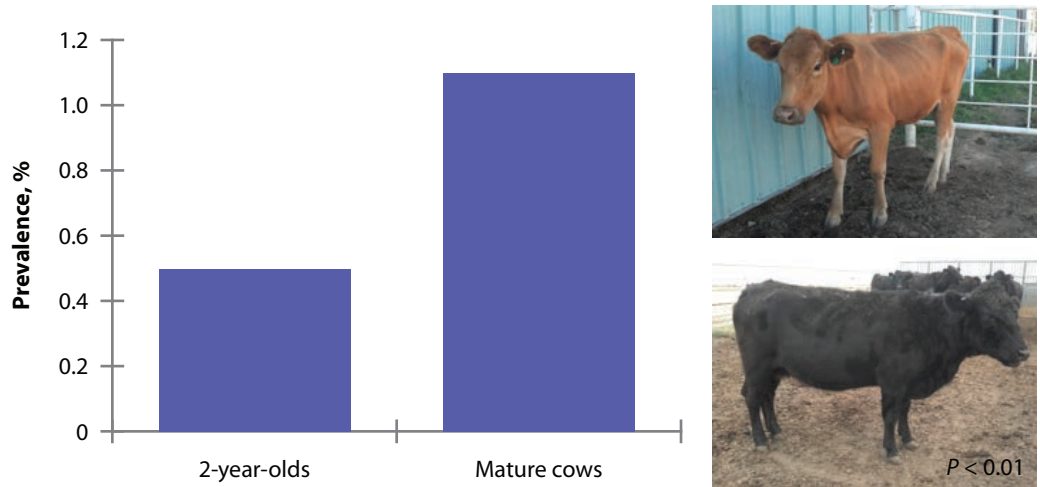
Effect of Weaning on Body Condition Recovery and Calf Performance in Previously Nutritionally Restricted Cow-Calf Pairs

Sandy Johnson

Objective: Quantify differences in performance and intake between early weaned and lactating cows and calves still nursing dams to evaluate production and economic differences between early and normal weaning scenarios.

Study Description: A combination of 36 first-calf heifers and mature cows, previously nutritionally restricted, were early weaned or calves remained with cows during a 77-day re-feeding period. A common ration composed of ground CRP hay (70.2%), wet distillers grain (28.3%), and a mineral package (1.5%), all dry matter basis, was delivered 3 times per day to both groups. Daily intakes of cows were measured utilizing a digital GrowSafe System (GrowSafe, Alberta, Canada). Body condition scores (1 = thin; 9 = very fat) and body weights of the all the cows were taken at day 0 and again at day 77.

Body condition change in 2-year-old and mature cows after a 77-day re-feeding period following nutrient restriction



The Bottom Line: Early weaning helped increase body condition in both 2-year-old and mature cows, but 2-year-old cows recovered only half as much condition in the same amount of time as mature cows when feeding both age groups together.



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Dosing with Lactipro Decreases Forage Intake and Manure Output

Kevin Miller

Objective: Determine the impact of a traditional step-up regimen or orally dosing steers with 100 mL of Lactipro (MS Biotec, Wamego, KS) and placing them directly onto finishing diets on apparent total tract digestibility and manure output during the step-up period.

Study Description: Ninety steers were given brome hay upon arrival at the Kansas State University Beef Cattle Research Center. Approximately 24 hours after arrival, steers were processed and assigned to a traditional 3-diet step-up regimen where each diet was fed for 6 days (Control) or orally dosed with 100 mL of Lactipro at processing and placed directly onto a finishing diet (Lactipro). Steers were housed in concrete-surfaced pens, and total pen fecal output was collected daily for 24 days. Daily dry matter intake was measured during the same period. Fecal samples were composited into 6-day periods for each pen corresponding to each step-up diet fed to the Control steers.

Feed consumption, manure output, and apparent total tract diet digestibility during the first 24 days on feed for steers fed a traditional step-up regimen (Control) or dosed with Lactipro at processing and placed directly onto finishing diets (Lactipro)

Item	Control	Lactipro	SEM	P-value
Feed intake (dry basis), lb	19.6	17.0	0.15	<0.01
Manure output (dry basis), lb	5.1	3.7	0.06	<0.01
Digestibility, %				
Dry matter	72.9	74.5	0.73	0.11
Crude protein	70.0	71.8	0.69	0.05
Neutral detergent fiber	45.8	35.8	2.81	<0.01
Starch	99.9	99.8	0.04	0.30
Phosphorus	32.6	40.2	2.79	0.07

The Bottom Line: Dry matter intake and fecal output were decreased during the step-up period when steers were dosed with Lactipro and placed directly onto a finishing diet.



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Dosing High-Risk Calves at Processing with Lactipro Decreases the Number of Calves Treated for Bovine Respiratory Disease

Kevin Miller

Objective: Determine if dosing high-risk calves with Lactipro (MS Biotec, Wamego, KS) at processing decreases the number of calves requiring antibiotic therapy for bovine respiratory disease.

Study Description: The symptoms of acidosis and bovine respiratory disease are not readily distinguishable from one another, and therapeutic treatments for respiratory disease generally are ineffective for treatment of acidosis. Lactipro is a probiotic that prevents accumulation of lactic acid in the rumen, which is a key organic acid associated with development of feedlot acidosis. Six hundred and forty-five calves (504 bulls, 141 steers) were received from Texas and fed brome hay on arrival. Twenty-four hours later, calves were vaccinated, dewormed, treated with Micotil (Elanco Animal Health, Greenfield, IN), and bulls were castrated (banded). Calves were randomly assigned to a Control group (no Lactipro) or a Lactipro group (100-mL oral dose of Lactipro at processing), placed into 24 pens with 25 to 30 calves/pen, and fed a common receiving diet for 64 days. Calves were monitored daily for clinical signs of respiratory disease, including depression, decreased appetite, increased respiration, nasal and ocular discharge, and diarrhea.

Performance of high-risk calves orally drenched with Lactipro¹ at processing

Item	Control	Lactipro	SEM	P-value
Initial weight, lb	440	446	10.8	0.23
Final weight, lb	557.5	579.1	9.3	<0.01
Average daily gain, lb	1.42	1.76	0.16	0.02
Dry matter intake, lb/day	9.53	10.16	0.37	0.01
Feed:gain, lb/lb	6.80	5.75	0.59	0.05
Total morbidity, % of cattle	37.7	26.4	4.81	0.02
Treatment for bovine respiratory disease, % of cattle				
First-time treatment (Micotil ²)	32.0	22.0	4.13	0.02
Second-time treatment (Baytril ³)	17.4	11.5	2.09	0.03
Third-time treatment (LA-200 ⁴)	5.9	4.4	1.22	0.36
Death loss, %	4.9	3.8	1.13	0.50
Medication cost, \$/calf	19.70	17.06	0.98	0.01

¹ MS Biotec, Wamego, KS.

² Elanco Animal Health, Greenfield, IN.

³ Bayer Animal Health, Shawnee Mission, KS.

⁴ Pfizer Animal Health, Whitehouse Station, NJ.



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The Bottom Line: Lactipro improved performance and decreased the number of calves requiring antibiotic therapy for bovine respiratory disease.

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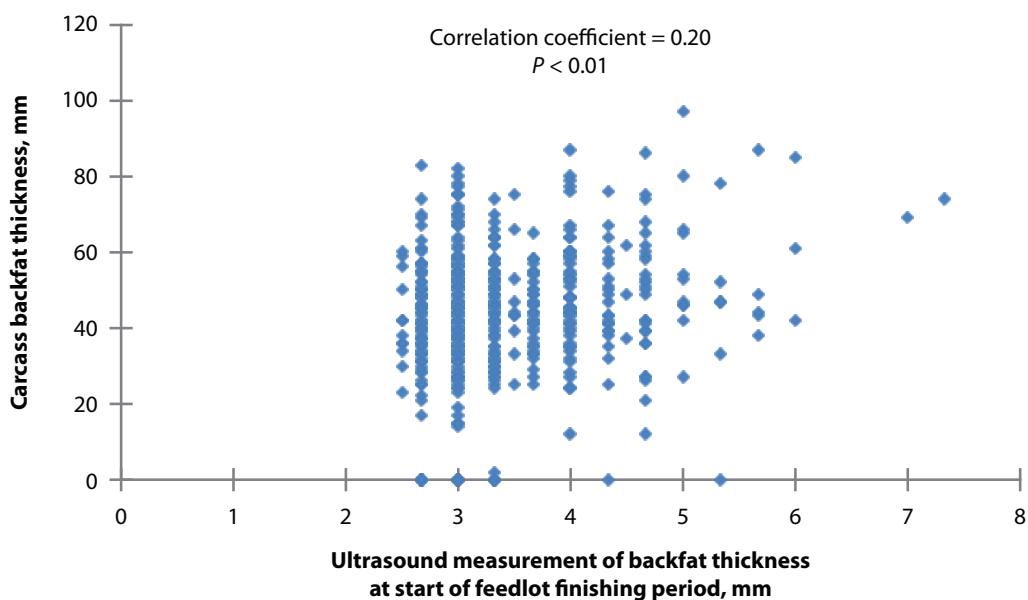
Ultrasound Technology has Limited Ability to Predict Carcass Yield Grade of Lightweight, Short-Fed Stocker Cattle

Dale Blasi

Objective: Evaluate the value of implementing ultrasound technology with lightweight calves for the prediction of carcass fat thickness and yield grade outcomes.

Study Description: Ultrasound measurements were collected on lightweight stocker calves ($n = 550$, initial body weight = 450 lb) prior to placement in a commercial feedlot. All calves were rescanned approximately 60 days after arrival to the commercial feedlot.

Results: The correlation between initial fat thickness and carcass fat thickness was relatively poor ($r = 0.20$; $P < 0.01$), suggesting initial ultrasound measurements have limited utility as a predictor of carcass fatness and yield grade.



The Bottom Line: Correlation between initial ultrasound measurements of fat thickness and carcass fat thickness measurements at harvest is low, indicating that ultrasound measurements have limited value as a predictor of carcass fatness.



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Evidence of Estrus Before CIDR Insertion Does Not Influence Pregnancy Rate to Fixed-Timed Artificial Insemination in Beef Heifers

Sandy Johnson

Objective: Determine if the onset of estrus prior to a prostaglandin (PG) 6-day controlled internal drug release (CIDR) protocol would improve pregnancy rates to fixed-time artificial insemination in beef heifers.

Study Description: Ovulation was synchronized in 94 Angus and Angus cross-bred heifers at 2 locations with a PG 6-day CIDR protocol. Heifers received 2 mL of Cystorelin (100 µg gonadotropin-releasing hormone) and a CIDR insert on day -6. On day 0, CIDR inserts were removed and 25 mg of PG (5 mL Lutalyse; Pfizer Animal Health, Whitehouse Station, NJ) was administered intramuscularly. A single fixed-timed insemination occurred 66 hours after CIDR insert removal. On day -9, all heifers received an Estroject (Western Point, Inc., Apple Valley, MN) heat detection patch and 5 mL Lutalyse. On day -6, Estroject patches were scored as activated, partially activated, or non-activated. On day 0, missing or activated patches were replaced and scoring occurred again at the time of artificial insemination.

Results: On day -6 at the time of CIDR insertion, 30, 8, and 58 heifers had patches that were activated, partially activated, or non-activated, respectively. Pregnancy rate to artificial insemination was similar regardless of patch activation at the time of CIDR insertion. At the time of artificial insemination, 60, 23, and 14 heifers had patches that were activated, partially activated, or non-activated, respectively. Pregnancy rate to artificial insemination was similar between heifers that had a fully activated patch and those with non-activated patches.

The Bottom Line: The onset of estrus as measured by patch activation prior to CIDR insertion did not result in higher pregnancy rates to fixed-timed artificial insemination compared with heifers with non-activated patches.



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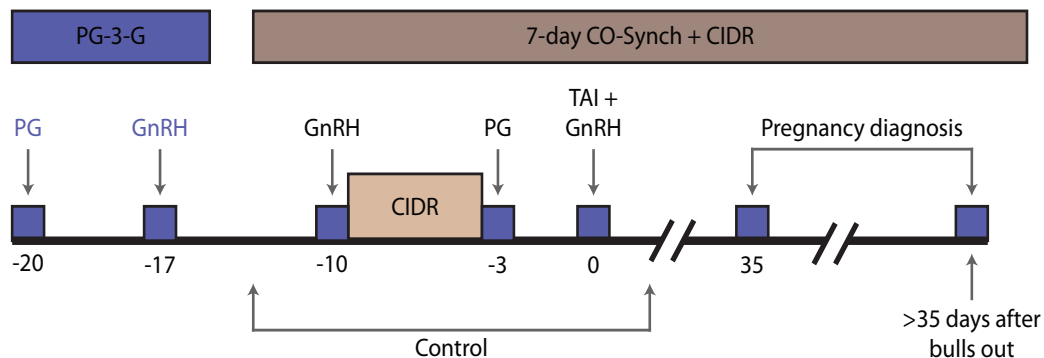
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Presynchronizing PG_{2α} and GnRH Injections Before Timed Artificial Insemination CO-Synch + CIDR Program

Scott Hill

Objective: Determine if presynchronizing estrous cycles in cycling cows with prostaglandin F_{2α} (PG) and gonadotropin-releasing hormone (GnRH) 1 week before applying a timed artificial insemination program increases pregnancy outcomes over the standard 7-day CO-Synch + controlled internal drug release (CIDR) protocol.

Study Description: Suckled mixed-breed primiparous and multiparous beef cows (n = 809) in 11 pastures at 4 operations in Kansas and Florida were assigned randomly to 2 treatments. Cows in the presynchronization treatment (PG-3-G) received 25 mg of PG followed in 3 days by 100 μg of GnRH. One week after the GnRH treatment, all cows were started on the standard 7-day CO-Synch + CIDR protocol (control). Removal of the CIDR and the breeding PG injection was followed in 66 to 70 hours with timed artificial insemination and a second GnRH injection. Pregnancy was determined by ultrasound 35 days after artificial insemination.



GnRH = gonadotropin-releasing hormone (Factrel; Pfizer Animal Health, Whitehouse Station, NJ);
PG = prostaglandin F_{2α} (Lutalyse; Pfizer Animal Health);
CIDR = controlled internal drug release containing progesterone; TAI = timed artificial insemination.

Results: The PG-3-G cows did not have a greater ($P = 0.336$) pregnancy rate (49.0 vs. 45.1%) compared with controls. Cycling status did not influence pregnancy rate; however, cows with body condition scores ≥ 5.5 had better ($P = 0.065$) pregnancy outcomes (50.9 vs. 43.3%). Cows that had calved at least 77 days before artificial insemination also had greater ($P = 0.002$) pregnancy rates (54.6 vs. 39.6%).



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The Bottom Line: Presynchronizing with PG and GnRH did not improve the pregnancy rate over a standard CO-Synch + CIDR protocol. Cows that were in good body condition (≥ 5.5) and those that were more than 77 days from calving at artificial insemination had greater pregnancy rates.

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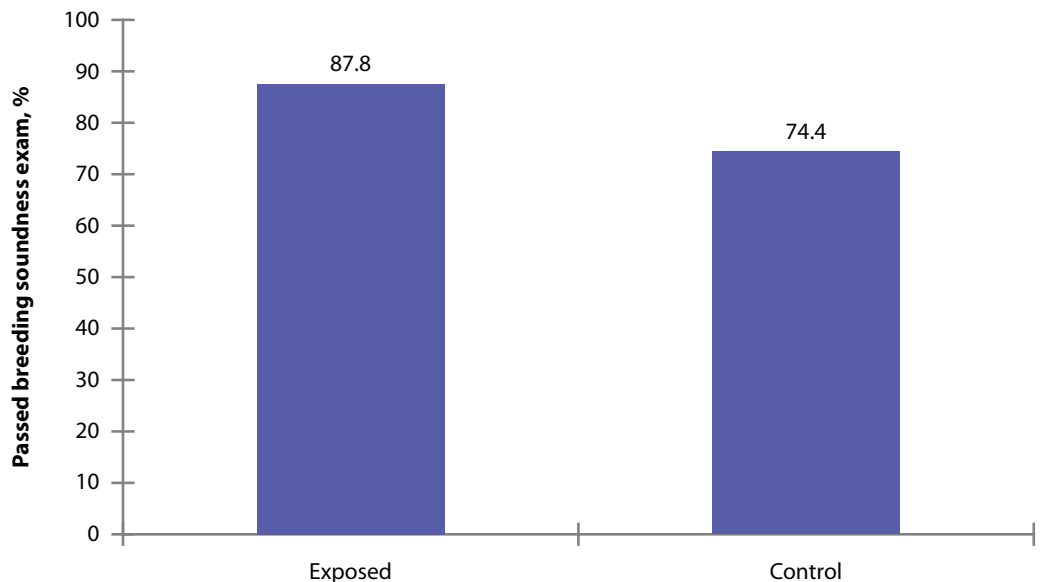
Exposure of Young Beef Bulls to Cycling Females Does Not Enhance Sexual Development

Natalie Miller

Objective: Determine if continuous, long-term fence-line exposure of prepubertal beef bulls to cycling females affects age at puberty, sexual behaviors, and bulls' ability to pass an initial breeding soundness examination (BSE).

Study Description: Prepubertal beef bulls were given fence-line (nose-to-nose and visual) contact or no contact with cycling beef females from 6.5 to 12 months of age. Bulls were considered pubertal when they had a scrotal circumference of ≥ 10.2 inches, a semen sample with ≥ 50 million sperm per mL, and $\geq 10\%$ sperm motility. Breeding soundness examinations were conducted when bulls averaged 12 months of age. Bulls passed their BSE if they had $\geq 30\%$ sperm motility and $\geq 70\%$ normal sperm morphology.

Results: Bull age, weight, scrotal circumference, and semen characteristics at puberty were not influenced ($P > 0.10$) by fence-line exposure with cycling females. The percentage of bulls that passed their first BSE was also unaffected by exposure to cycling females ($P = 0.54$).



The Bottom Line: Exposure of prepubertal beef bulls to cycling beef females neither enhances bull sexual development nor influences percentage of bulls passing their initial BSE. Cattle producers would not benefit from penning developing bulls next to cycling females.



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Effects of Corn Processing and Wet Corn Gluten Feed on Newly Received and Growing Cattle

Anna Siverson

Objective: Evaluate the effects of corn processing (whole shelled or dry-rolled), dietary wet corn gluten feed inclusion, or their interaction on the performance of newly received cattle.

Study Description: A study was conducted at the Kansas State University Beef Stocker Unit to evaluate effects of corn processing and inclusion of wet corn gluten feed on performance of receiving and growing cattle. Crossbred steers (n = 279) were randomly assigned to 1 of 4 treatments. Treatments were whole shelled corn (WSC) with no WCGF (WSC/0WCGF), WSC with 30% WCGF (WSC/30WCGF), dry-rolled corn (DRC) with no WCGF (DRC/0WCGF), and DRC with 30% WCGF (DRC/30WCGF). All diets contained the same amount of alfalfa and prairie hay, and diets without WCGF contained 5% molasses to condition the total mixed ration. Cattle were fed for 60 days.

Effects of whole shelled corn and dry-rolled corn with 0 or 30% wet corn gluten feed (WCGF) on average daily gain, feed intake, efficiency, and diet digestibility

Item	Whole shelled corn		Dry-rolled corn		SEM	<i>P</i> -values		
	0WCGF	30WCGF	0WCGF	30WCGF		Corn	WCGF	Corn × WCGF
Feed intake, lb/day	16.3	17.4	16.6	16.6	0.34	0.45	0.13	0.12
Daily gain, lb	3.3	3.5	3.3	3.5	0.09	0.93	0.04	0.40
Gain:feed	0.20	0.20	0.20	0.21	0.006	0.60	0.47	0.65
Dry matter digestibility, %	59.69	60.19	55.73	61.86	1.15	0.32	0.006	0.017

The Bottom Line: Performance was similar for cattle fed whole shelled and dry-rolled corn. Wet corn gluten feed improved gain and diet digestibility but did not affect efficiency of gain.



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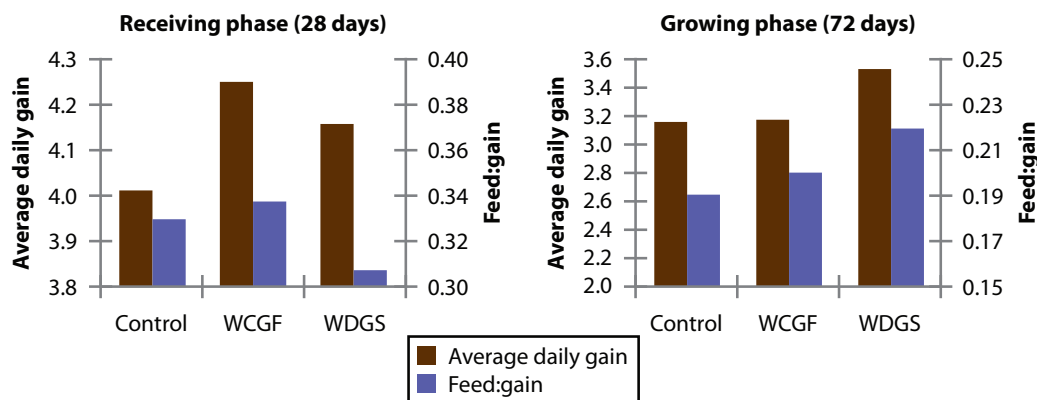
Byproducts Are Effective Alternatives to Corn for Receiving and Growing Cattle

Dale Blasi

Objective: Compare the performance outcomes of newly arrived and growing calves fed a standard corn-based diet to that of calves fed diets containing wet distillers grains with solubles (WDGS) or wet corn gluten feed (WCGF).

Study Description: A 9-day study using steers was initiated at the Kansas State University Beef Stocker Unit in May 2012. All steers were completely randomized to diet treatments. Steers were assigned to 3 treatments with 8 pen replicates per treatment. The treatment groups included a traditional corn-based diet (Control), or diets in which corn, molasses, and a portion of a protein supplement were replaced with either 30% wet corn gluten feed WCGF or 30% WDGS.

Results: Feeding WDGS during the receiving period increased dry matter intake but did not improve growth performance compared with cattle fed the Control and WCGF diets. Feeding WDGS during the growing period provided for increased gain and improved feed efficiency compared with cattle fed the Control or WCGF diets.



The Bottom Line: Replacing corn, molasses, and a portion of a protein supplement with 30% WCGF or 30% WDGS on a dry matter basis results in similar or improved growth performance.



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Calf Health and Performance During Receiving Is Not Changed by Fence-Line Preconditioning on Flint Hills Range vs. Drylot Preconditioning

Eric Bailey

Objective: Measure calf growth and health performance during a 28-day preconditioning phase and during a 60-day feedlot receiving phase.

Study Description: Calves were subjected to 1 of 3 ranch-of-origin preconditioning methods for 28 days: drylot weaning + dam separation (Drylot), pasture weaning + fence-line contact with dams (Pasture), and pasture weaning + fence-line contact with dams + supplemental feed delivered in a bunk (Pasture+Feed). After preconditioning, calves were shipped to a feedlot for finishing and placed on a grower ration for 60 days.

Performance of beef calves subjected to 1 of 3 ranch-of-origin preconditioning regimens during a 60-day feedlot receiving period

Item	Preconditioning program		
	Drylot	Pasture + Feed	Pasture
Preconditioning phase			
Average daily gain (ADG), lb	0.68	-0.62	-0.75
Incidence of fever, %	5.01	0.63	1.91
Receiving phase			
ADG to day 30, lb	2.47	2.40	1.96
ADG to day 60, lb	3.13	2.93	2.82
Dry matter intake, lb/day	17.20	17.02	16.98
Feed/gain, lb/lb	5.49	5.80	6.04

The Bottom Line: Health and performance of beef calves preconditioned in the Flint Hills was not improved by fence-line weaning. Best management practices may include beginning the transition to a grain-based diet on the ranch of origin.



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Efficiency of Early Weaned Beef Calves Is Not Improved by Restricting Feed Intake During 84-Day Growing Phase

Eric Bailey

Objective: Measure gain and efficiency of lightweight, early weaned beef calves during an 84-day, postweaning growing phase when feed intakes were varied to achieve targeted gains of 1, 2, or 3 lb/day.

Study Description: Immediately following weaning, calves were fed a common diet at 1 of 3 rates to achieve targeted average daily gains during an 84-day back-grounding phase: 1 lb/day, 2 lb/day, or 3 lb/day. Calves were blocked by gender and assigned to 1 of 18 pens (6 pens/treatment) at the Kansas State University Agricultural Research Center in Hays, KS.

Performance of beef calves fed a common diet to achieve targeted gains of 1, 2, or 3 lb/day

	Targeted average daily gain (ADG)			SEM
	1 lb/day	2 lb/day	3 lb/day	
Weaning weight, lb	341	341	347	11.5
Final weight, lb	444 ^a	468 ^a	510 ^b	9.0
ADG, lb	1.21 ^a	1.53 ^b	1.94 ^c	0.064
Feed intake, lb/day	4.57 ^a	6.03 ^b	7.58 ^c	0.002
Feed:gain	3.77	4.00	3.87	0.333
Incidence of fever, %	4.89	6.05	5.85	3.046

^a Values with different superscript letters are different, $P < 0.05$.

The Bottom Line: Lightweight, early weaned calves that were fed a grain-based diet at restricted rates did not exhibit improved feed efficiency relative to full-fed counterparts.



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Infrequent Supplementation with Dried Distillers Grain Does Not Affect Cow Performance

Bradley Bennett

Objective: Examine the effect of supplementation frequency on performance of spring-calving cows fed dried distillers grains with solubles (DDGS) as a supplement during the winter feeding period.

Study Description: Pregnant Angus-cross cows ($n = 120$) were fed DDGS as a protein supplement daily, every 3 days, or every 6 days from December 27, 2011, through March 20, 2012. All cows were maintained together in a common native range pasture, sorted daily for feeding, and provided the equivalent of 0.5 lb crude protein/cow per day in the form of DDGS (29.5% crude protein). Cow body weight and body condition scores were collected every 28 days throughout the duration of the study.

Performance of cows receiving dried distillers grains with solubles daily (Daily), at 3-day intervals (3Day), or at 6-day intervals (6Day)

Item	Supplementation interval		
	Daily	3Day	6Day
Number of cows	38	31	37
Initial weight, lb	1241.7	1256.4	1239.6
Calving weight, lb	1243.3	1256.5	1247.0
Weight change, lb	1.5	0.3	7.4
Turnout weight, lb ¹	1312.8	1329.2	1301.2
Body condition score ²			
Initial	5.07	5.18	4.97
Calving	5.28	5.31	5.16
Change	0.21	0.13	0.19
Calf weight, lb	84.6	86.9	83.4
Average calving date	03/24/2012	03/22/2012	03/22/2012

¹ Weight at turnout onto summer native range pasture (May 7, 2012).

² Scale of 1 to 9; 1 = extremely emaciated, 9 = extremely obese.

The Bottom Line: Supplementing cows with protein as infrequently as every 6 days did not negatively affect cow body weight or body condition score. Producers can reduce cost using DDGS as an inexpensive protein source and can reduce labor and fuel costs with infrequent delivery.



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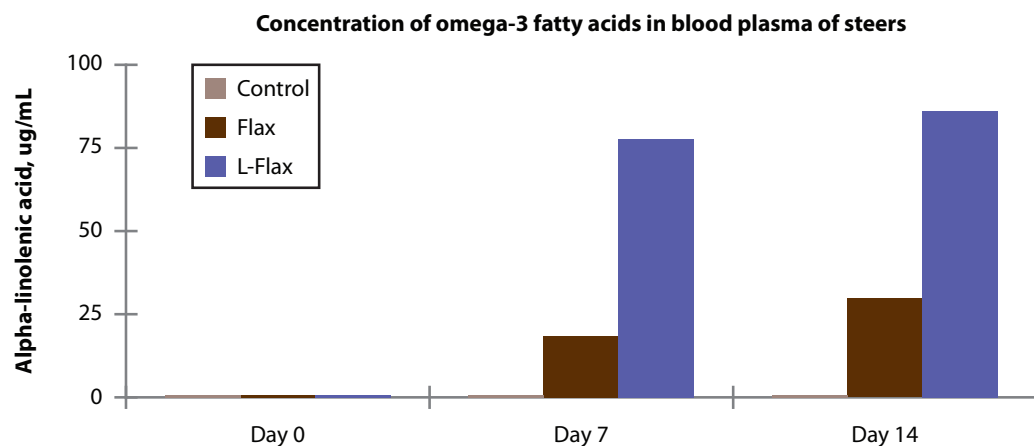
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Hydrated Lime Matrix Decreases Ruminal Biohydrogenation of Flaxseed Fatty Acids

Christian Alvarado

Objective: Determine if encapsulation of flaxseed with dolomitic lime could be used as a method to decrease biohydrogenation of polyunsaturated omega-3 fatty acids by rumen microorganisms, thus increasing concentrations of omega-3 fatty acids absorbed into the bloodstream.

Study Description: Encapsulation of fats has been proposed as a method for improving efficiency of transfer of omega-3 fats into beef. Yearling steers (45 head; 557 ± 40 lb) were blocked by weight and randomly allocated to three treatments: a Control diet (no flaxseed), a group fed a diet containing ground flaxseed (Flax), and another group fed a diet containing ground flaxseed that had been embedded within a protective matrix consisting of dolomitic lime hydrate (L-Flax). Diets (50% roughage/50% concentrate) were fed for 14 days. Blood samples were taken on days 0, 7, and 14 of the study and analyzed for concentrations of major long-chain fatty acids, including alpha-linolenic acid, which is a key omega-3 fatty acid.



The Bottom Line: Embedding ground flaxseed into a protective matrix consisting of dolomitic lime hydrate is an effective method for delivery of omega-3 fatty acids to improve their efficiency of transfer from the diet into tissues of cattle.



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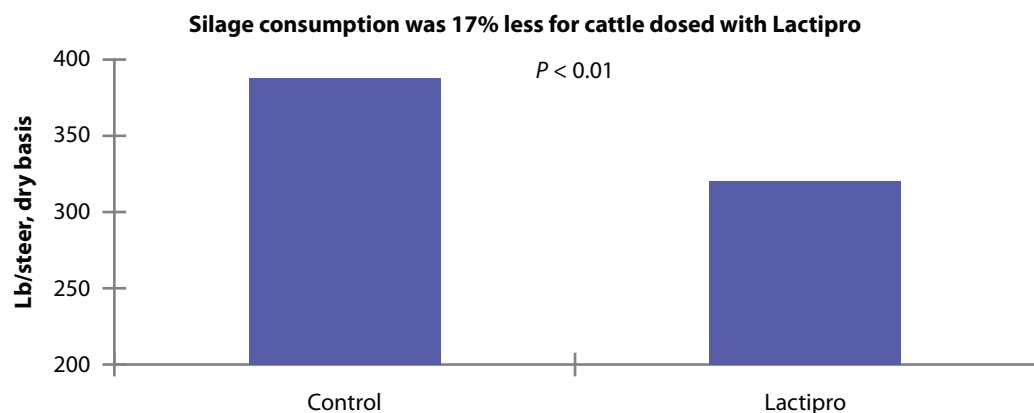
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Steers Dosed with Lactipro and Placed Directly onto Finishing Diets Consume Less Roughage During the Finishing Period

Kevin Miller

Objective: Determine if steers dosed with Lactipro (MS Biotec, Wamego, KS) at initial processing could be placed onto a finishing diet to reduce the quantity of roughage required during the finishing period.

Study Description: Crossbred steers (n = 443) were fed brome hay and processed and assigned to treatments approximately 24 hours later. Steers were fed a traditional 3-diet step-up regimen where each diet was fed for 6 days (Control) or were orally drenched with Lactipro and placed directly onto a finish diet (Lactipro). Study diets were based on steam-flaked corn, wet corn gluten feed, and corn silage. Steers were fed for 115 days and then harvested.



Feedlot performance and carcass traits of steers dosed with Lactipro at initial processing and placed directly onto a finishing diet

Item	Control	Lactipro	SEM	P-value
Initial weight, lb	887	879	5.4	0.12
Dry matter intake, lb/day	28.3	27.8	0.26	0.07
Average daily gain, lb	4.99	4.96	0.076	0.65
Feed:gain, lb/lb	5.68	5.60	0.051	0.14
Carcass weight, lb	887	881	0.71	0.23
Liver abscesses, %	11.8	10.8	2.14	0.75
USDA Choice, %	80.1	86.5	2.50	0.07

The Bottom Line: Steers dosed with Lactipro and placed directly onto finishing diets consumed 17% less roughage during the finishing period and had similar performance and carcass traits.



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Crude Glycerin Improves Feed Efficiency in Finishing Heifers

Eric van Cleef

Objective: The objective of this study was to evaluate feedlot performance and carcass characteristics of finishing heifers fed diets containing high levels of crude glycerin in the presence and absence of added salt.

Study Description: Heifers ($n = 375, 736 \pm 38$ lb) were used to evaluate the effects of crude glycerin at 7.5 or 15% of the diet dry matter, with and without added salt. Diets were composed of dry-rolled corn, 10% corn silage, 35% wet corn gluten feed, 20% soybean hulls, and supplement, and crude glycerin replaced dry-rolled corn. Diets were fed once daily for 125 days, and heifers were then transported to a commercial abattoir for harvest and collection of carcass data.

Feedlot performance and carcass characteristics of heifers fed diets containing crude glycerin with 0 or 0.3% added salt

Item	Control	7.5% glycerin		15% glycerin	
		Salt	No salt	Salt	No salt
Average daily gain, lb	4.03	3.80	4.06	3.98	3.86
Dry matter intake, lb/day	27.3	26.1	26.0	25.2	24.8
Feed:gain, lb/lb	6.76	6.86	6.39	6.29	6.41
Hot carcass weight, lb	814	803	816	803	798
USDA yield grade	2.63	2.49	2.56	2.36	2.35
Marbling score ¹	512	485	458	476	474

¹ Marbling scores determined by USDA graders; small = 400–499, modest = 500–599.

The Bottom Line: Feeding crude glycerin decreased feed intake and improved feed efficiency but tended to decrease carcass weight and accumulation of body fat, including marbling.



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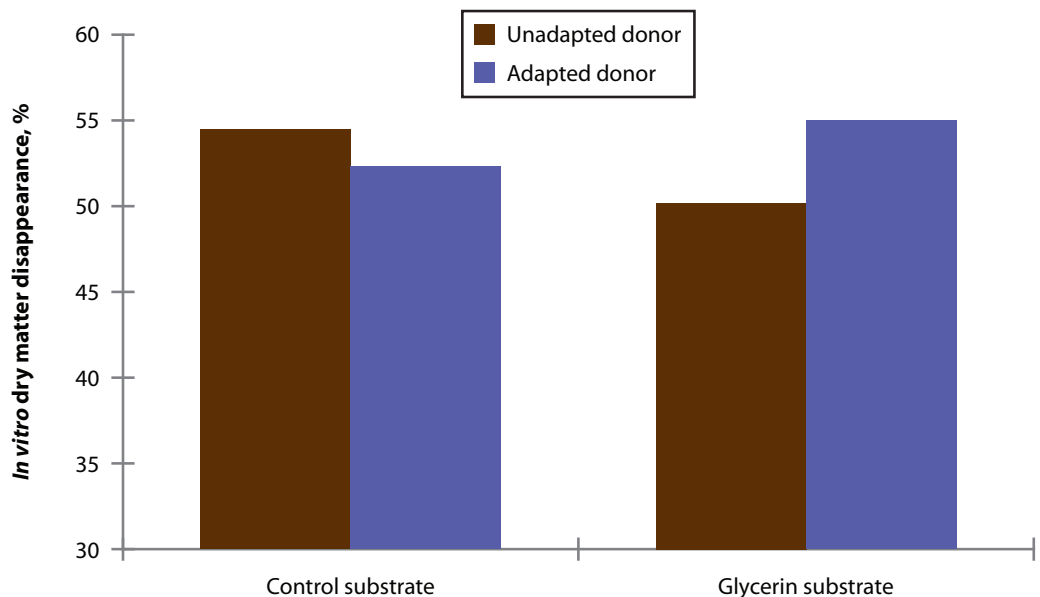
Prior Adaptation Improves Crude Glycerin Utilization by Cattle

Eric van Cleef

Objective: To evaluate the adaptive response to glycerin supplementation by measuring *in vitro* digestion using ruminal microbes that were obtained from cattle fed diets with or without added glycerin.

Study Description: Ruminally cannulated Holstein steers ($n = 4$) fed finishing diets containing 0 or 15% crude glycerin were used as donors of ruminal contents for inoculation of *in vitro* cultures. Ruminal contents were removed from each animal, strained to remove large particles, mixed with artificial saliva, and placed into culture flasks containing finishing diets with 0 or 15% glycerin. *In vitro* dry matter disappearance (an estimator of digestion) and the production of fermentative gasses and volatile fatty acids were measured.

Results: Figure 1 illustrates the effects of donor animal diet and *in vitro* substrate on the disappearance of dry matter (an estimate of digestion) from our cultures. When glycerin was added to *in vitro* cultures containing ruminal inoculum from unadapted animals, digestion was mildly depressed, but digestibility increased slightly when glycerin was added to cultures containing ruminal inoculum from adapted animals.



The Bottom Line: This study supports our contention that there is an adaptive response to glycerin utilization by ruminal microorganisms.



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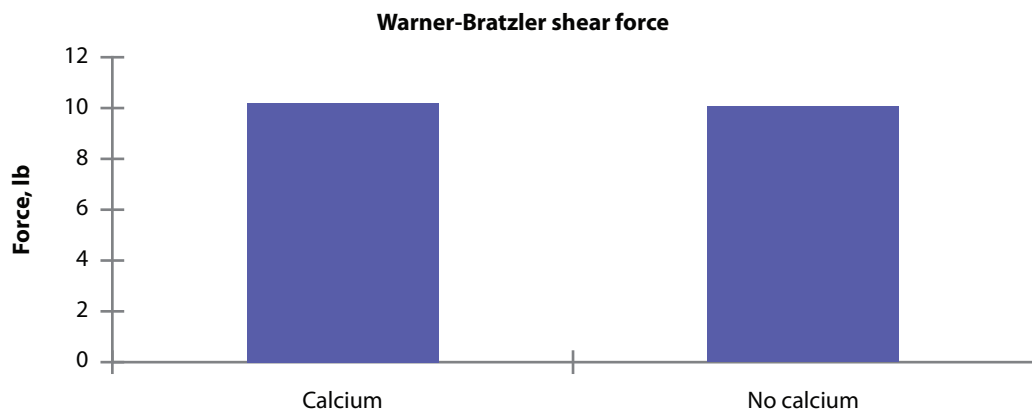
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Removal of Supplemental Dietary Calcium Does Not Influence Beef Tenderness

Cadra Van Bibber-Krueger

Objective: Determine if temporary removal of supplemental calcium sources from the diets of finishing cattle could affect beef tenderness.

Study Description: Heifers (n = 96; 864 lb) were sorted by body weight and assigned to treatments. Treatments consisted of: (1) a diet containing supplemental calcium in the form of limestone (Calcium), and (2) a diet in which the limestone had been removed (No Calcium). Prior to Zilmax (Merck Animal Health, Summit, NJ) supplementation, all cattle were fed the control diet. The experimental diets were fed for a period of 21 days in conjunction Zilmax. After 21 days, Zilmax was removed, and cattle were placed back onto a common diet containing limestone for 3 days before harvest. Carcass data were collected at harvest, and loin sections were collected for Warner-Bratzler shear force determination after a 10-day period of wet aging.



The Bottom Line: Removing calcium from the diet had no effect on feedlot performance, carcass quality, or beef tenderness.



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SUMMARY PUBLICATION

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