2015 Beef Cattle Report
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Table of Contents 2015 Nebraska Beef Cattle Report

Cow/Calf
Impact of Heifer Development System on Subsequent Gain and Reproduction ................................................................. 5
Genetic Parameter Estimates for Calving Difficulty and Birth Weight in a Multibreed Population ........................................ 8
Estimation of British- and Continental-Specific Heterosis Effects for Birth, Weaning, and Yearling Weight in Cattle .......... 10
Using Sugar Beet Pulp to Replace Wheat Straw when Limit Feeding Late Gestation Beef Cows ........................................ 12
Supplementing Cow-Calf Pairs Grazing Smooth Bromegrass .................................................................................. 14
Effects of Calf Age at Weaning on Cow and Calf Performance and Feed Utilization in an Intensive Production System ...... 16
An Economic Analysis of Conventional and Alternative Cow-Calf Production Systems ............................................. 19
Effect of Post-Weaning Management and Age at Weaning on Calf Growing and Finishing Performance .................. 22

Growing
Dried Distillers Grains Supplementation of Calves Grazing Irrigated Corn Residue .......................................................... 25
Comparison of Commercial Lick Tubs to Distillers Grains Supplementation for Calves Grazing Corn Residue .............. 27
Efficacy of Bovatec 2.2 Mineral Blocks for Cattle Grazing Crested Wheatgrass Pastures ............................................... 30
Effect of Distillers Grains Plus Solubles and Monensin Supplementation on Grazing Steers ............................................. 32
Comparison of Wet or Dry Distillers Grains Plus Solubles to Corn as an Energy Source in Forage-Based Diets ............. 34
Effects of Processing Treated Corn Stover and Distillers Grains on Performance of Growing Cattle ....................... 36
Digestibility of Calcium Oxide Treated Corn Residue with De-Oiled Distillers Grains .................................................. 38
Digestibility of De-oiled Modified Distillers Grains Plus Solubles in Forage-based Diets .............................................. 40
Evaluation of the Impact of an Alternative Corn Residue Harvest Method on Performance and Methane Emissions from Growing Cattle .......................................................... 42
Effect of Diet on the Rumen Microbial Community Composition of Growing Cattle and the Role It Plays in Methane Emissions .................................................................................. 45

Forage Management and Crop Residue Utilization
Stocking Rate Effects on Forage Nutrient Composition in Early Summer Pastures ......................................................... 48
Effects of Grazing on Nebraska Sandhills Meadow Forage Nutrient Content ............................................................... 51
Effect of Corn Residue Removal on Subsequent Crop Yields .................................................................................. 53
Effect of Corn Plant Maturity on Yield and Nutrient Quality of Corn Plants ............................................................... 56
Evaluation of Changes in Nutritional Quality of Corn Residue Over Time ................................................................. 59
Effect of Harvest Method on In Vitro Digestibility of Corn Residues ........................................................................ 62
Effects of Ingestion and Collection Bag Type on Nutrient Composition of Forage Samples from Esophageally Fistulated Cattle ......................................................................................... 64

Finishing
Feeding Elevated Levels of Corn Silage and MDGS in Finishing Diets ......................................................................... 66
The Effects of Corn Price, Shrink, and Harvest Moisture on Corn Silage Economics ...................................................... 68
Evaluation of Rumen Metabolism and Digestibility of Corn Silage and MDGS Finishing Diets .................................... 71
Response to Increasing Concentrations of De-oiled Modified Distillers Grains Plus Solubles in Beef Feedlot Diets .......... 74
Feeding Value of De-oiled Wet Distillers Grains Plus Solubles Relative to Normal When Fed with Either Dry-Rolled Corn or Steam-Flaked Corn in Beef Finishing Diets ........................................... 77
Nutrient Digestibility and Ruminal pH of Finishing Diets Containing Dry Milling Byproducts with and without Oil Extraction ......................................................................................................................... 80
Effects of Replacing Corn with a Pelleted Treated Corn Stover and Distillers Grains on Intake and Total Tract Digestibility of Finishing Diets ........................................................................................................................ 83
Effects of Replacing Corn with a Pelleted Treated Corn Stover and Distillers Grains on Performance of Finishing Cattle .... 86
Using Enspira to Improve Fiber Digestion ...................................................................................................................... 88
Effect of 300 or 400 mg Daily of Ractopamine Hydrochloride on Growth Performance and Carcass Characteristics of Finishing Steers During the Last 14, 28, or 42 Days ........................................... 90

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Effect of Zinc and Copper Source on Finishing Steer Feedlot Performance and Incidence of Footrot ........................................... 98
Effects of Next Enhance® Concentrations in Finishing Diets on Performance and Carcass Characteristics of Yearling
Feedlot Cattle ................................................................................................................................. 101
Evaluating Two Rates of Monensin Fed During the Grain Adaptation Period on Cattle Performance and Carcass
Characteristics ...................................................................................................................................... 103
Effects of Dietary Fat Source and Monensin on Methane Emissions, VFA Profile, and Performance of Finishing Steers .... 105
Mineral Composition of Beef Cattle Carcasses .................................................................................. 108
Mineral Composition of Serial Slaughter Holstein Carcasses ........................................................................... 111
Anaerobic Digestion of Feedlot Manure .............................................................................................. 115

Beef Products

A Basic Mechanism of Beef Tenderization: Feeding Wet Distilers Grains Plus Solubles Contributes to Sarcoplasmic
Reticulum Membrane Instability ........................................................................................................... 117
The Effects of Source and Amount of Nitrite on Quality Characteristics of All-Beef Frankfurters ......................... 120
Effect of Feeding Distillers Grains in Different Phases of Production on the Fatty Acid Profile and Oxidation of Frozen,
Cooked Beef Links ................................................................................................................................... 122
Effect of Feeding Distillers Grains and Supplementing with Dietary Antioxidants on Ground Beef Color During
Retail Display ............................................................................................................................................... 124

Statistics Used in Nebraska Beef Cattle Report and Their Purpose ................................................................. 125
Statistics Used in the Nebraska Beef Report and Their Purpose

The purpose of beef cattle and beef product research at University of Nebraska–Lincoln is to provide reference information that represents the various populations (cows, calves, heifers, feeders, carcasses, retail products, etc.) of beef production. Obviously, the researcher cannot apply treatments to every member of a population; therefore, he/she must sample the population. The use of statistics allows the researcher and readers of the Nebraska Beef Report the opportunity to evaluate separation of random (chance) occurrences and real biological effects of a treatment. Following is a brief description of the major statistics used in the beef report. For a more detailed description of the expectations of authors and parameters used in animal science see Journal of Animal Science Style and Form at: http://jas.fass.org/misc/ifora.shtml.

— **Mean** — Data for individual experimental units (cows, steers, steaks) exposed to the same treatment are generally averaged and reported in the text, tables and figures. The statistical term representing the average of a group of data points is mean.

— **Variability** — The inconsistency among the individual experimental units used to calculate a mean for the item measured is the variance. For example, if the ADG for all the steers used to calculate the mean for a treatment is 3.5 lb then the variance is zero. But, this situation never happens! However, if ADG for individual steers used to calculate the mean for a treatment range from 1.0 lb to 5.0 lb, then the variance is large. The variance may be reported as standard deviation (square root of the variance) or as standard error of the mean. The standard error is the standard deviation of the mean as if we had done repeated samplings of data to calculate multiple means for a given treatment. In most cases treatment means and their measure of variability will be expressed as follows: 3.5 ± 0.15. This would be a mean of 3.5 followed by the standard error of the mean of 0.15. A helpful step combining both the mean and the variability from an experiment to conclude whether the treatment results in a real biological effect is to calculate a 95% confidence interval. This interval would be twice the standard error added to and subtracted from the mean. In the example above, this interval is 3.2-3.8 lb. If in an experiment, these intervals calculated for treatments of interest overlap, the experiment does not provide satisfactory evidence to conclude that treatments effects are different.

— **P Value** — Probability (P Value) refers to the likelihood the observed differences among treatment means are due to chance. For example, if the author reports \( P \leq 0.05 \) as the significance level for a test of the differences between treatments as they affect ADG, the reader may conclude there is less than a 5% chance the differences observed between the means are a random occurrence and the treatments do not affect ADG. Hence we conclude that, because this probability of chance occurrence is small, there must be difference between the treatments in their effect on ADG. It is generally accepted among researchers when \( P \) values are less than or equal to 0.05, observed differences are deemed due to important treatment effects. Authors occasionally conclude that an effect is significant, hence real, if \( P \) values are between 0.05 and 0.10. Further, some authors may include a statement indicating there was a “tendency” or “trend” in the data. Authors often use these statements when \( P \) values are between 0.10 and 0.15, because they are not confident the differences among treatment means are real treatment effects. With \( P \) values of 0.10 and 0.15 the chance random sampling caused the observed differences is 1 in 10 and 1 in 6.7, respectively.
— **Linear & Quadratic Contrasts** — Some articles contain linear (L) and quadratic (Q) responses to treatments. These parameters are used when the research involves increasing amounts of a factor as treatments. Examples are increasing amounts of a ration ingredient (corn, by-product, or feed additive) or increasing amounts of a nutrient (protein, calcium, or vitamin E). The L and Q contrasts provide information regarding the shape of the response. Linear indicates a straight line response and quadratic indicates a curved response. P-values for these contrasts have the same interpretation as described above.

— **Correlation (r)** — Correlation indicates amount of linear relationship of two measurements. The correlation coefficient can range from -1 to 1. Values near zero indicate a weak relationship, values near 1 indicate a strong positive relationship, and a value of -1 indicates a strong negative relationship.
Animal Science
http://animalscience.unl.edu

Curriculum: The curriculum of the Animal Science Department at the University of Nebraska-Lincoln is designed so that each student can select from a variety of options oriented to specific career goals in professions ranging from animal production to veterinary medicine. With unique opportunities to double major in Grazing Livestock Systems (http://gls.unl.edu) or complete the Feedlot Management Internship Program (http://feedlot.unl.edu/intern)

Careers:
Animal Health
Banking and Finance
Animal Management
Consultant
Education
Marketing
Technical Service
Meat Processing
Meat Safety
Quality Assurance
Research and Development
Veterinary Medicine

Scholarships: The Animal Science Department also offers scholarships to incoming freshmen and upperclassmen. The department awards over $30,000 each year to Animal Science students.

ABS Global Scholarship
Baltzell-Agri-Products, Inc. Scholarship
Maurice E. Boeckenhauer Memorial Scholarship
Mike Cull Judging and Activities Scholarship
Don Geweke Memorial Award
Parr Young Senior Merit Award
Nebraska Pork Producers Association Scholarship
Waldo Family Farms Scholarship
Frank and Mary Bruning Scholarship
Art and Ruth Raun Scholarship
Animal Science Department Freshman Scholarship
Feedlot Management Scholarship
Robert Boeckenhauer Memorial Scholarship
Burnell Scholarship Fund
Doane Scholarship
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Dwight F. Stephens Scholarship
Arthur W. and Viola Thompson Scholarship
Thomas H. Wake, III Scholarship
Frank E. Card Scholarship
Derrick Family Scholarship
G. H. Francke Livestock Judging Scholarship
Eric Peterson Memorial Award
Winkler Memorial Livestock Judging Scholarship