



Agricultural Research Division
 University of Nebraska Extension
 Institute of Agriculture and Natural Resources
 University of Nebraska–Lincoln

2015 Beef Cattle Report



Extension is a Division of the Institute of Agriculture and Natural Resources at the University of Nebraska–Lincoln cooperating with the Counties and the United States Department of Agriculture. University of Nebraska–Lincoln Extension educational programs abide with the nondiscrimination policies of the University of Nebraska–Lincoln and the United States Department of Agriculture.

ACKNOWLEDGMENTS

Appreciation is expressed to the following firms, associations, or agencies who provided grant support for research in the beef cattle program.

Cargill Corn Milling, Blair, Neb.	Nebraska Center for Energy Sciences Research,
Dr. Kenneth and Caroline McDonald Eng Foundation,	University of Nebraska–Lincoln, Neb.
San Antonio, Tex.	Nebraska Corn Board, Lincoln, Neb.
Elanco Animal Health, Indianapolis, Ind.	Novus International, St Charles, Mo.
Iowa Agricultural Bio Fibers, Harlan, Iowa	Pellet Technology USA, Gretna, Neb.
JBS United, Kalona, Iowa	Sweet Pro, Walhalla, N.D.
KAAPA Ethanol, LLC, Minden, Neb.	The Beef Checkoff, Centennial, Colo.
Merck Animal Health, DeSoto, Kan.	USDA MultiState Hatch Funds
National Cattlemen’s Beef Association, Centennial, Colo.	USDA NIFA Climate Change
Nebraska Beef Council, Kearney, Neb.	
Nebraska Cattlemen Research and Education	
Foundation, Lincoln, Neb.	

Appreciation is also expressed to the following firms who provide products or services

Archer Daniels Midland, Columbus, Neb.	Kemin Industries, Des Moines, Iowa
Cargill Corn Milling, Blair, Neb.	Merck Animal Health, DeSoto, Kan.
Cattlemen’s Nutrition Services, LLC, Lincoln, Neb.	Micronutrients, Indianapolis, Ind.
Elanco Animal Health, Indianapolis, Ind.	US Meat Animal Research Center, Clay Center, Neb.
Florida Food Products, Inc., Eustis, Fla.	USDA Meat Grading and Certification Branch, Omaha,
Greater Omaha Pack, Omaha, Neb.	Neb.
Iowa Limestone, Des Moines, Iowa	Zoetis Animal Health, New York, N.Y.

Appreciation is also expressed to the following research technicians, unit managers, and crew involved in the research programs at our various locations in Nebraska.

Agricultural Research & Development Center, Ithaca, Neb.

Eugene Anderson	Michael Luben	Ken Rezac
Jeff Bergman	Allison Miller	Tyler Rodman
Dirk Burken	Karl Moline	Mark Schroeder
Ken Cejka	Justin Moore	Matt Sullivan
Henry Hilscher	Chuck Rezac	Keith Street

Animal Science Department, Lincoln, Neb.

Curt Bittner	Jana Harding	Clyde Naber
Robby Bondurant	Melissa Jolly-Breithaupt	Andrea Watson
Meredith Bremer	Tommi Jones	

Gudmundsen Sandhills Laboratory, Whitman, Neb.

Andy Applegarth	Jacki Musgrave
Jay Holthus	John Nollette

Panhandle Research & Extension Center, Scottsbluff, Neb.

Josh Buttle	Jacob Hansen
Nabor Guzman	Doug Pieper

West Central Research & Extension Center, North Platte, Neb.

Mike Kirby	T.L. Meyer	Jim Teichert
Leslie Johnson		

Northeast Research & Extension Center, Norfolk, Neb.

Kevin Heithold	Lee Johnson
----------------	-------------

Dalbey Halleck Farm, Virginia, Neb.

Mark Dragastin	Rob Higgins
----------------	-------------

High Plains Ag Laboratory, Sidney, Neb.

Paul McMillen

Electronic copies of Nebraska Beef Reports and Summaries available at:
<http://beef.unl.edu>, click on reports.

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 <i>In Vitro</i> 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
Effects of Three Aggressive Implant Protocols on Feedlot Performance and Carcass Traits of Calf-Fed Steers	94
A Comparison of Two Implant Protocols: Synovex-Choice/Synovex-Plus vs. Synovex-S/Revalor-S on Steer Feedlot Performance and Carcass Characteristics	96

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 Distillers 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
Lincoln Coca-Cola Bottling Company
Scholarship.

William J. and Hazel J. Loeffel Scholarship
Nutrition Service Associates Scholarship
Parr Family Student Support Fund
Chris and Sarah Raun Memorial Scholarship
Walter A. and Alice V. Rockwell Scholarship
Standard Manufacturing Co. Scholarship
Max and Ora Mae Stark Scholarship
D.V. and Ernestine Stephens Memorial
Scholarship
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

UNIVERSITY OF
Nebraska[®] | Department of
Lincoln | Animal Science

P.O. Box 830908
C220 ANSC
Lincoln, NE 68583-0908 USA

Non Profit
US Postage
PAID
UNL