Dairy Research 2018

Foreword

Kansas State University is pleased to present the 2018 Dairy Research Report of Progress and proud to serve the growing Kansas dairy industry. During the past 5 years (2012 to 2017), total milk production in Kansas has increased by 28%, behind only Colorado and South Dakota among major dairy states. This growth is a product of a 21% increase in the number of cows as well as a 6% increase in milk per cow. At the end of 2017, 152,000 Kansas cows averaged 23,000 lb per lactation, ranking the state 16th in total milk production (3.5 billion lb). Kansas now has 290 dairy operations and averages 524 cows per herd (*Hoard's Dairyman*, March 25, 2018, pp 192-193). Adding to the growth in milk production in Kansas over the past decade is the recent surge in processing capacity in the state, resulting in a dynamic industry that is an increasingly important driver of economic activity.

Selected production traits of our Kansas State University Dairy Teaching and Research Center (DTRC) herd are shown below. The excellent functioning of our herd is largely a tribute to the dedication of our staff: Michael Scheffel (manager), Robert Feist, Alan Hubbard, Kris Frey, Eulises Jiron Corrales, Morgan Loomis, Alexandrea Eckert, Cory Sunderman, and Tony Hecht. In particular, we recognize Daniel Umscheid, who retired this year after 38 years of service to the DTRC. Special thanks are given to Haixia Liu and a host of graduate and undergraduate students for their technical assistance in our laboratories and at the DTRC. We also acknowledge the support and cooperation of the Heart of America Dairy Herd Improvement Association (DHIA) for its assistance in handling research milk samples.

Kansas State University Dairy Teaching and Research Center Herd[1]

Cows, total no.	277
Rolling herd milk, lb	31,441
Rolling herd fat, lb	1,150
Rolling herd protein, lb	918
Somatic cell count × 1,000	112
Calving interval, mo.	13.0

[1]November 6, 2018 test day (milking 2 to 3 times daily).

The sustained increases in productivity and efficiency on dairy farms in Kansas and across the U.S. are largely driven by improved technology and management decisions by dairy producers. It is our hope that the type of research presented in this report contributes to those improvements and helps to enhance the quality of dairy products to increase consumption.

Thorough, quality research is not only time-intensive and meticulous, but also expensive. Nevertheless, studies have demonstrated that each dollar spent for research yields a 30 to 50% return in practical application. Those interested in supporting dairy research are encouraged to consider participation in the Livestock and Meat Industry Council (LMIC), a philanthropic organization dedicated to furthering academic and research pursuits by the Department of Animal Sciences and Industry. Additional details about the LMIC are found at the end of this report.

B.J. Bradford, Editor
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Biological Variability and Chances of Error

Variability among individual animals in an experiment leads to problems in interpreting the results. Although cows on treatment X may have produced more milk than those on treatment Y, variability within treatments may indicate that the differences in production between X and Y were not the direct result of treatment alone. Statistical analysis allows us to calculate the probability that such differences occur because of the treatment applied rather than from chance.

In some of the articles herein, you will see the notation "$P < 0.05$." That means the probability of treatment differences resulting from chance is less than 5%. If two averages are reported to be "significantly different," the probability is less than 5% that the difference is from chance, or the probability exceeds 95% that the difference resulted from the treatment applied.

Some papers report correlations or measures of the relationship among traits. The relationship may be positive (both traits tend to get larger or smaller together) or negative (as one trait gets larger, the other gets smaller). A perfect correlation is one (+1 or -1). If there is no relationship, the correlation is zero.

In other papers, you may see an average given as 2.5 ± 0.1. The 2.5 is the average; 0.1 is the "standard error." The standard error is calculated to be 68% certain that the real average (with an unlimited number of animals) would fall within one standard error from the average, in this case between 2.4 and 2.6.

Using many animals per treatment, replicating treatments several times, and using uniform animals increase the probability of finding real differences when they exist. Statistical analysis allows more valid interpretation of the results, regardless of the number of animals in the experiment. In all the research reported herein, statistical analyses are included to increase the confidence you can place in the results.

The Livestock and Meat Industry Council, Inc.

The Livestock and Meat Industry Council, Inc. (LMIC) is a nonprofit charitable organization supporting animal agriculture research, teaching, and education. This is accomplished through the support of individuals and businesses that make LMIC a part of their charitable giving.

Tax-deductible contributions can be made through gifts of cash, appreciated securities, real estate, life insurance, charitable remainder trusts, and bequests as well as many other forms of planned giving. LMIC can also receive gifts of livestock, machinery, or equipment. These types of gifts, known as gifts-in-kind, allow the donor to be eligible for a tax benefit based on the appraised value of the gift.

Since its inception in 1970, LMIC has provided student scholarships, research assistance, capital improvements, land, buildings, and equipment to support students, faculty, and the industry of animal agriculture. If you would like to be a part of this mission or would like additional information, please contact the Livestock and Meat Industry Council/Animal Sciences and Industry, Weber Hall, Manhattan, KS, 66506 or call 785-532-1227.

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