

Kansas Agricultural Experiment Station Research Reports

Volume 4
Issue 9 *Swine Day*

Article 47

2018

2018 Swine Day Foreword, Etc.

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Recommended Citation

Goodband, R. D. (2018) "2018 Swine Day Foreword, Etc.," *Kansas Agricultural Experiment Station Research Reports*: Vol. 4: Iss. 9. <https://doi.org/10.4148/2378-5977.7695>

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Foreword

It is with great pleasure that we present the 2018 Swine Industry Day Report of Progress. This report contains updates and summaries of applied and basic research conducted at Kansas State University during the past year. We hope that the information will be of benefit as we attempt to meet the needs of the Kansas swine industry.

2018 Swine Day Report of Progress Editors

Bob Goodband
Mike Tokach
Steve Dritz
Joel DeRouchey
Jason Woodworth

Standard Abbreviations

ADG	= average daily gain	mEq	= milliequivalent(s)
ADF	= acid detergent fiber	min	= minute(s)
ADFI	= average daily feed intake	mg	= milligram(s)
AI	= artificial insemination	mL	= cc (cubic centimeters)
avg	= average	mm	= millimeter(s)
bu	= bushel	mo	= month(s)
BW	= body weight	MUFA	= monounsaturated fatty acid
cm	= centimeter(s)	N	= nitrogen
CP	= crude protein	NE	= net energy
CV	= coefficient of variation	NDF	= neutral detergent fiber
cwt	= 100 lb	NFE	= nitrogen-free extract
d	= day(s)	ng	= nanogram(s), .001 Fg
DE	= digestible energy	no.	= number
DM	= dry matter	NRC	= National Research Council
DMI	= dry matter intake	ppb	= parts per billion
F/G	= feed efficiency	ppm	= parts per million
ft	= foot(feet)	psi	= pounds per square inch
ft ²	= square foot(feet)	PUFA	= polyunsaturated fatty acid
g	= gram(s)	SD	= standard deviation
µg	= microgram(s), .001 mg	sec	= second(s)
gal	= gallon(s)	SE	= standard error
GE	= gross energy	SEM	= standard error of the mean
h	= hour(s)	SEW	= segregated early weaning
HCW	= hot carcass weight	SFA	= saturated fatty acid
in	= inch(es)	UFA	= unsaturated fatty acid
IU	= international	wk	= week(s)
unit(s) kg	= kilogram(s)	wt	= weight(s)
kcal	= kilocalorie(s)	yr	= year(s)
kWh	= kilowatt hour(s)		
lb	= pound(s)		
Mcal	= megacalorie(s)		
ME	= metabolizable energy		

K-State Vitamin and Trace Mineral Premixes

Diets listed in this report contain the following vitamin and trace mineral premixes unless otherwise specified.

- Trace mineral premix: Each pound of premix contains 10 g Mn, 33 g Fe, 33 g Zn, 5 g Cu, 90 mg I, and 90 mg Se.
- Vitamin premix: Each pound of premix contains 750,000 IU vitamin A, 300,000 IU vitamin D3, 8,000 mg vitamin E (dl-alpha-tocopherol acetate or 4,000 mg d-alpha-tocopherol acetate), 600 mg menadione, 1,500 mg riboflavin, 5,000 mg pantothenic acid, 9,000 mg niacin, and 6 mg vitamin B12.
- Sow add pack: Each pound of premix contains 750,000 IU vitamin A, 100,000 mg choline, 40 mg biotin, 400 mg folic acid, 180 mg pyridoxine, 4,000 mg Vitamin E (dl-alpha-tocopherol acetate or 2,000 mg d-alpha-tocopherol acetate), 9,000 mg L-carnitine, and 36 mg Cr.

Note

Some of the research reported here was carried out under special U.S. Food and Drug Administration (FDA) clearances that apply only to investigational uses at approved research institutions. Materials that require FDA clearances may be used in the field only at the levels and for the use specified in that clearance.

Biological Variability and Chances of Error

Variability among individual animals in an experiment leads to problems in interpreting the results. Animals on treatment X may have higher average daily gains than those on treatment Y, but variability within treatments may indicate that the differences in production between X and Y were not the result of the treatment alone. Statistical analysis allows us to calculate the probability that such differences are from treatment rather than from chance.

In some of the articles herein, you will see the notation " $P < 0.05$." That means the probability of the differences resulting from chance is less than 5%. If two averages are said 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 treatments applied.

Some papers report correlations or measures of the relationship between 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 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 all the research reported herein, statistical analyses are included to increase the confidence you can place in the results.

Index of key words

administration route	fecal enterococci
antimicrobial resistance	feed additive
<i>Bacillus subtilis</i>	feed-grade amino acids
bacteria	feed processing
blending	feeding regimen
bone ash	ferrous carbonate
calcium (Ca)	fiber
Calsporin®	finishing feed
cellulose	finishing pigs
chloride	gestation
chlortetracycline (CTC)	gilt
color	gleptoferron
compensatory growth	growing-finishing pigs
conditioner temperature	growth performance
consumer	heavy weight pigs
consumer preference	high-lysine sorghum
corn	histidine
crude protein	hot carcass weight
deoxynivalenol	isoflavone
diarrhea	iron (Fe)
dietary electrolyte balance	iron sulfate
digestible phosphorus	lactation
distillers dried grains	lysine
dried distillers grains with solubles (DDGS)	marbling
drinker	medium chain fatty acid (MCFA)
economic analysis	microbiome
efficacy	minimum inhibitory concentration
enterotoxigenic <i>Escherichia coli</i> (ETEC)	modeling
enzyme	monolaurin
fat inclusion	nursery feed
fecal consistency	nursery pigs
	nutrition

oat groats	salt
oats	shear force
palatability	sodium (Na)
particle size	sodium metabisulfite
pellet binder	sow
pellet durability index	soybean meal
pellet quality	space requirements
pelleting	sugar beet pulp
phosphorus (P)	swine
phytase	tenderness
phytase stability	timing
pig	tylosin
pork	vaccination
pork quality	visual
post-weaning	vitamins
preservative	water
probiotic	weanling pig
retention time	withdrawal

Acknowledgments

Appreciation is expressed to these organizations for assisting with swine research at Kansas State University.

Abilene Animal Hospital, Abilene, KS	Kalmbach Feeds, Upper Sandusky, OH
ADM Co., Decatur, IL	Kansas Pork Association, Manhattan, KS
Ajinomoto Heartland LLC, Chicago, IL	Kansas Swine Alliance, Abilene, KS
Biowish Technologies, Cincinnati, OH	Kemin Industries, Inc., Des Moines, IA
Ceva Bioimmune, Lenexa, KS	Lincolnway Energy, Nevada, MO
Christensen Family Farms, Sleepy Eye, MN	Livestock and Meat Industry Council, Manhattan, KS
Collaborative Sorghum Investment Program, Kansas State University	Micronutrients, Indianapolis, IN
DNA Genetics, Columbus, NE	Minnesota Pork Board, Mankato, MN
DSM Nutritional Products, Parsippany, NJ	National Pork Board, Des Moines, IA
Feedlogic Corporation, Willmar, MN	Natural Foods Holdings, Sioux City, IA
Feed One Co., Ltd., Yokohama, Japan	Gene Nemechek Family, Wilson, NC
Hamlet Proteins, Findlay, OH	New Fashion Pork, Jackson, MN
Haverkamp Brothers, Bern, KS	New Horizon Farms, Pipestone, MN
Roy and Linda Henry, Longford, KS	Ocean Harvest Technology Limited, Galway, Ireland
Holden Farms, Northfield, MN	Olimix, Brehan, France
Hord Family Farms, Bucyrus, OH	Origination, Inc., Maplewood, MN
Hubbard Feeds, Mankato, MN	PIC USA, Hendersonville, TN
ICM, Inc., Colwich, KS	Pipestone Applied Research, Pipestone, MN
ILC Resources, Urbandale, IA	Purco, Edgerton, MN
International Ingredient Corporation, St. Louis, MO	Purina Animal Nutrition, Shoreview, MN
Iowa Select Farms, Inc., Iowa Falls, IA	Quality Technology International, Inc., Elgin, IL
JBS Live Pork, Greeley, CO	
JYGA Technologies, St. Nicolas, Quebec, Canada	

Sustainable Nutrition S.I., Alcala de Gurrea, Spain	Triumph Foods, St. Joseph, MO
SVC Research, LLC, St. Peter, MN	United Sorghum Checkoff, Lubbock, TX
Swine Health Information Center, Ames, IA	U.S. Soybean Board, Chesterfield, MO
Bob and Karen Thaler, Brookings, SD	USDA National Institute of Food and Agriculture, Washington, D.C.
Tech Mix, LLC, Stewart, MN	Zinpro Corp., Eden Prairie, MN
Thomas Livestock Company, Broken Bow, NE	

We especially appreciate the assistance and dedication of Kansas State University employees Duane Baughman, Frank Jennings, Mark Nelson, Chance Fiehler, Caitlin Evans, Courtney Truelock, Ashton Yoder, and Theresa Rathbun.

Appreciation is also expressed to: Allan Morris, Heath Houselog, Marty Heintz, Craig Steck, Bayley Kroupa, Whitney Adler, and Bob Taubert, New Horizon Farms, Pipestone, MN, for their dedicated support.

Appreciation is expressed to Triumph Foods LLC, St. Joseph, MO, and Jerry Lehenbauer, Brad Knadler, Dr. Emily Arkfeld, and Dr. Barry Wisemann for technical assistance.

Swine Industry Day Committee

Joel DeRouchey
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The Livestock and Meat Industry Council, Inc.

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