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Director's Report of Research in Kansas 2017

J. E. Minton

Kansas State University, eminton@ksu.edu

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DIRECTOR'S REPORT OF RESEARCH IN KANSAS 2017

JULY 1, 2016–JUNE 30, 2017

K-STATE
Research and Extension

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Letter of Transmittal

Office of the Director

To the Honorable Sam Brownback, Governor of Kansas

It is my pleasure to transmit herewith the report of the Agricultural Experiment Station of the Kansas State University of Agriculture and Applied Science for the fiscal year ending June 30, 2017. This report contains the title, author, and publication information for manuscripts published by station scientists. The report was published only in electronic format.

John D. Floros, Ph.D.
Director, K-State Research and Extension
Dean, College of Agriculture

A Message from the Director

It is a pleasure to provide the 2017 Director's Report of Research in Kansas. The report documents our research programs and some of our accomplishments. K-State Research and Extension provides trusted, practical education to help individuals, businesses and communities solve problems, develop skills, and build a better future.

This report is produced and distributed in electronic format. This reduces printing costs and makes the report accessible to a broader audience.

The 2017 Director's Report of Research in Kansas includes a list of journal articles, station publications, and other published manuscripts from scientists in our departments, research-extension centers, and associated programs.

The Kansas Agricultural Experiment Station was established in 1887 to conduct research vital to the success of Kansas. In 1914, the Kansas Cooperative Extension Service was created to disseminate research-based information to the public. During our strategic planning process, we received input from 5,000 stakeholders to determine five grand challenges facing Kansans — global food systems, water, health, developing tomorrow's leaders, and community vitality. Our research programs provide the latest information through our statewide network to address those challenges.

John D. Floros, Ph.D.
Director, K-State Research and Extension
Dean, College of Agriculture

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A Message from the Associate Director of Research

The Hatch Act established the Kansas Agricultural Experiment Station in 1887 as the food, agriculture, and natural resources research component of Kansas State University, the nation's first operational land-grant university.

Our statewide network of centers and experiment fields allows our faculty to evaluate crop and livestock production systems across a wide range of environmental conditions.

This research helps Kansas farmers contribute to feeding a growing world population. By 2050, there will be an estimated 9.6 billion people globally. Every year, we develop and test nearly 1,000 new wheat breeding lines, tirelessly working to find only the best ones that will grow well in Kansas. In 2016, one of our varieties – Everest – was the top variety planted in Kansas for the fourth straight year.

Great wheat varieties mean great harvests for Kansas farmers, which in turn benefits the local, regional and state economies.

K-State's Agricultural Experiment Station funds research in 20 academic departments across five colleges on two campuses. In addition to long-term research projects on livestock and crop breeding, scientists are looking at new ways to control pests and diseases, emerging technologies to save water and energy, food safety, postharvest storage, weed control, and more. As an example of the value of this work, it is estimated that Kansas' farms would lose \$2.4 billion in crop yield value if weeds are not controlled.

As Kansas' largest employer, agriculture contributes 43 percent of the state's economy. More than 234,000 people are involved in the production, distribution, and transportation of agricultural products. Our research focuses on the agricultural industry and helping it grow in a sustainable manner.

Kansas Agricultural Experiment Station research expenditures — all funds used to produce research outcomes — represent the majority of Kansas State University's total research effort. Funds are usually awarded through a highly competitive federal grant system.

J. Ernest Minton
Associate Director, Research, K-State Research and Extension
Associate Dean, Research and Graduate Programs, College of Agriculture

Agricultural Experiment Station and University Research Expenditures (in millions)

Making a State Impact

Time to Burn: Study examines best season for prescribed burns

As researchers continue exploring the benefits of summer prescribed burning, Kansas land managers may be on the brink of a real opportunity to explore this alternative on their own property.

KC Olson, K-State professor of range beef cattle nutrition and management, has been researching the benefits of moving prescribed burning from spring to late summer.

Olson's research began in 2014. The data from that four-year study shows late-summer burning dramatically reduces the incidence of sericea lespedeza, a noxious weed found in at least one-third of the Flint Hills. The plant is known to out-compete native plants for water and nutrients, and it contains high levels of condensed tannins that make it undesirable for cattle grazing.

"We've started data collection for a six-year trial, which will involve livestock performance as a primary metric," he said. "We're going to test the influences of a traditional spring burn, a summertime burn in the August-September interval, and a fall burn in the September-October interval, to see how those options influence subsequent livestock performance."

Olson hopes to make a significant contribution to the growing pile of data, confirming the benefits of summer burning.

Poor weather conditions this past April prompted some land-owners to postpone pasture burning. Many worried that the moisture was inadequate to fuel the lush regrowth, which is the impetus for burning. Olson hopes pasture managers try summer burning.

Spring versus summer

Like a spring burn, you're still applying fire to plant material. "I recommend people hang their old fire management paradigms on a hook and look at it with fresh eyes, because this is a different animal," Olson said.

"Expect it to move at about one quarter of the surface wind speed. For example, if the surface wind speed is 10 miles an hour, expect that fire to move at about 2½ miles an hour. You can walk and keep up with these things."

In summer, green and growing foliage contains more water. For the people working the fire, as well as neighbors, the experience is less irritating.

"As the fire makes contact, that water flash boils," Olson said. "The smoke cloud looks dense, more intimidating, but that's because of all the steam."

To reduce walking in extreme heat, Olson modified his prescribed fire team. "We're using more small vehicles – think all-terrain vehicles – to work that fire line. If possible, no one walks more than a few feet to spare our people unnecessary exertion in extremely hot temperatures."

Olson added that his summer burn teams generally employ fewer people than his spring burn teams.

"The aftermath of a spring fire usually looks like a pool table – slick, black, and little residual material," Olson observed. "In the summer, fire intensity is much lower. Chances are most of the above ground vegetation is not going to go away completely. You will see standing green material immediately after the fire passes, and it looks like the fire didn't have any effect at all. But maybe 48 hours after the fire, what was standing green material the day of the fire is now brown, dead, and top-killed. You've just caused the whole plant community to reboot itself."

While those are the major differences between spring and summer burns, all the rules and ordinances apply. You still have to contact your county government for a burn permit. You still have to advise local emergency management teams of your fire, both before you light it and after it's out.

Professor KC Olson, left, initiates a summer pasture burn to reduce the incidence of sericea lespedeza, a noxious weed found in at least one-third of the Flint Hills.

Research Components of the Kansas Agricultural Experiment Station

(see map, next page)

Academic Departments

College of Agriculture

Agricultural Economics
Agronomy
Animal Sciences and Industry
Communications and Agricultural Education
Entomology
Grain Science and Industry
Horticulture and Natural Resources
Plant Pathology

College of Arts and Sciences

Biochemistry and Molecular Biophysics
Division of Biology
Sociology, Anthropology, and Social Work
Statistics

College of Engineering

Biological and Agricultural Engineering

College of Human Ecology

Apparel, Textiles, and Interior Design
Hospitality Management
Family Studies and Human Services
Food, Nutrition, Dietetics and Health

College of Veterinary Medicine

Anatomy and Physiology
Clinical Sciences
Diagnostic Medicine/Pathobiology

Research Centers

Agricultural Research Center
(Hays, HB Ranch, and Saline Experimental Range)
K-State Research and Extension Center
for Horticultural Crops (Olathe)
Northwest Research-Extension Center (Colby)
Southeast Research and Extension Center
(Parsons, Columbus, Mound Valley)
Southwest Research Center (Tribune)
Southwest Research-Extension Center (Garden City)

Experiment Fields

East Central (Ottawa)
John C. Pair Horticultural Center (Haysville)
Kansas River Valley (Rossville, Topeka)
North Central and Irrigation (Belleville, Scandia)
Pecan Field (Chetopa)
South Central (Hutchinson)

USAID Feed the Future Innovation Labs

Applied Wheat Genomics
Reduction of Post-Harvest Loss
Sorghum and Millet
Sustainable Intensification

Kansas State University Agricultural Research Locations

Associated Programs

AgManager.info
 Beef Cattle Research Center
 Beef Stocker Unit
 Bio Materials and Technology Lab
 Bioprocessing and Industrial Value-Added Products
 Biosecurity Research Institute
 Cargill Feed Safety Research Center
 Center for Bio-based Products by Design
 Center for Risk Management Education and Research
 Center for Rural Enterprise Engagement
 Center for Sorghum Improvement
 Center for Sustainable Energy
 Environmental Health and Safety Office
 Food Science Institute
 Fungal Genetics Stock Center
 Grain-Feed Microbiology and Toxicology Laboratory
 Great Plains Diagnostic Network
 International Grains Program Institute
 Insect Zoo
 Hal Ross Flour Mill
 Horse Unit
 K-State Global Food Systems
 K-State Libraries
 K-State Meat Lab (cooking, sensory, color, chemistry, microbiology, customized)
 K-State Pet Food Program

K-State Radio Network
 K-State Rapid Response Center
 Kansas Agriculture and Rural Leadership
 Kansas Center for Agricultural Resources and the Environment
 Kansas Center for Sustainable Agriculture and Alternative Crops
 Kansas Cooperative Extension Service
 Kansas FFA
 Kansas Wheat Innovation Center
 Kansas Youth Institute
 Kansas Value-Added Foods Lab
 Kansas Water Resources Institute
 Konza Prairie Biological Station
 KSRE News and Media Services
 National Science Foundation Industry/University Cooperative
 Research for Wheat Genetics
 O. H. Kruse Feed Technology Innovation Center
 Plant Biotechnology Center
 Sheep and Meat Goat Center
 Soil Carbon Center
 Tom Avery Poultry and Game Bird Research Unit
 University Gardens
 Veterinary Diagnostic Laboratory
 Weather Data Library
 Wheat Genetics Resource Center
 Wheat Quality Lab

Station Publications

Reports of Progress

SRP 1128	2016 Kansas Performance Tests with Winter Wheat Varieties
SRP 1129	2016 Kansas Performance Tests with Corn Hybrids
SRP 1130	2016 Kansas Performance Tests with Soybean Varieties
SRP 1131	2016 Kansas Performance Tests with Grain Sorghum Hybrids
SRP 1133	2016 Kansas Performance Tests with Sunflower Hybrids
SRP 1132	2017 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland *Cattlemen's Day 2017 2017 Agricultural Research, Southeast Agricultural Research Center K-State Turfgrass Research 2017 Kansas Field Research 2017 Kansas Fertilizer Research 2017 Field Day 2017, Southwest Research-Extension Center Swine Day 2017 Dairy Research 2017

Special Publications

DRR16	Director's Report of Research in Kansas 2016
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Understanding Contribution Numbers

Contribution numbers have three parts:

- The first two digits denote the year (state fiscal) of assignment.
- The second set of digits identifies the manuscript (numbered consecutively throughout the year).
- The suffix letter identifies the type of publication.

A	Proceedings of meeting or symposium
B	Book or book chapter
C	Computer program
D	Department report
J	Journal manuscript
S	Station publication (Report of Progress, Keeping up with Research, Special Publication, or Bulletin)
T	Trade publication

Categories are based on information received before manuscripts are published. Type of publication sometimes changes later.

Station publications are available at:

<http://newprairiepress.org/kaesrr/>

<http://www.bookstore.ksre.ksu.edu/>

Department reports are available only from the appropriate department office. Copies of journal articles or other external publications must be obtained from authors, journals, or a library. Some citations include a digital object identifier (doi) for use in retrieving manuscripts online. To locate an object using its doi, simply paste the doi into your browser or visit <http://dx.doi.org/>.

*As of March 2015, Kansas Agricultural Experiment Station reports are posted at <http://newprairiepress.org/kaesrr/>. These reports no longer have "SRP" numbers. They are now listed by volume and issue (2015 Cattlemen's Day Research, Volume 1, Issue 1; <http://newprairiepress.org/kaesrr/vol1/iss1/>). Recommended citations and doi numbers are listed with each report.

Recommended Citation

Vesco, A. C.; Sexten, A. K.; Weibert, C. S.; Oleen, B. E.; Hollenbeck, W. R.; Grimes, L. C.; and Blasi, Dale (2015) "Evaluation of the Productivity of a Single Subcutaneous Injection of LongRange in Stocker Calves Compared With a Positive (Dectomax) and a Negative (Saline) Control," Kansas Agricultural Experiment Station Research Reports: Vol. 1: Iss. 1. <http://dx.doi.org/10.4148/2378-5977.1018>

Agricultural Economics

- 15-454-J Quantifying the agronomic and economic performance of hybrid and conventional rice varieties
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Agronomy Journal
February 2016
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- 16-146-J Cooperating to compete: turning toward a community of practice
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- 16-338-J Trends in the use of new-media marketing in U.S. ornamental horticulture industries
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Vol. 101, Issue 2
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Agricultural Research Center - Hays

16-267-J Reduced absorption of glyphosate and decreased translocation of dicamba contribute to poor control of kochia (*Kochia scoparia*) at high temperature
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May 2018
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June 2017
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- 17-105-J *Camelina sativa* as a fallow replacement crop in wheat-based crop production systems in the US Great Plains
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- 17-280-J Increased power to dissect adaptive traits in global sorghum diversity using a nested association mapping population
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Achieving Sustainable Cultivation in Sorghum: Genetics, Breeding, and Production Techniques (Rooney, W.L., ed.)
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- 15-454-J Quantifying the agronomic and economic performance of hybrid and conventional rice varieties
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February 2016
Vol. 108
10.2134/agronj2015.0526
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October 2017
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May 2018
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