

# Kansas Agricultural Experiment Station Research Reports

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## Director's report of research in Kansas 2011

Kansas State University. Agricultural Experiment Station

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# Director's report of research in Kansas 2011

## **Abstract**

This report contains the title, author, and publication information for manuscripts published by station scientists.

## **Keywords**

Kansas; Agricultural Experiment Station; Research; Publications; Finances; Projects

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# DIRECTOR'S REPORT OF RESEARCH IN KANSAS 2011

JULY 1, 2010 TO JUNE 30, 2011



KANSAS AGRICULTURAL  
EXPERIMENT STATION

## **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, 2011. This report contains the title, author, and publication information for manuscripts published by station scientists. The report was published only in electronic format.

Gary Pierzynski  
Interim Director, K-State Research and Extension  
and Interim Dean, College of Agriculture

## A Message from the Director

We are pleased to provide this 2011 Director's Report of Research in Kansas. The report is intended to inform you about our research programs under way and some of our accomplishments. K-State Research and Extension is dedicated to a safe and sustainable food and fiber system and to strong, healthy communities, families, and youth through integrated research, analysis, and education.

This report is produced and distributed in electronic format only. An annual report distributed via the Internet provides information in a more timely fashion, eliminates printing costs, and makes the report accessible to a broader audience.

The 2011 Director's Report of Research in Kansas provides a list of journal articles, station publications, and other published manuscripts from scientists in our departments, centers, fields, and associated programs.

The Agricultural Experiment Station is the research component of K-State Research and Extension. Our research programs provide the latest information used by our extension programs to address issues facing Kansas citizens.

Gary Pierzynski  
Interim Director, K-State Research and Extension  
and Interim Dean, College of Agriculture



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To minimize irrelevant items when searching for common names such as Smith, go to the page for the author’s unit (or use the unit bookmark) to start your search.



# 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  
Entomology  
Grain Science and Industry  
Horticulture, Forestry and Recreation Resources  
Plant Pathology

### College of Arts and Sciences

Biochemistry  
Biology  
Statistics

### College of Engineering

Biological and Agricultural Engineering  
Chemical Engineering

### College of Human Ecology

Apparel, Textiles, and Interior Design  
Hospitality Management and Dietetics  
Human Nutrition

### College of Veterinary Medicine

Anatomy and Physiology  
Clinical Sciences  
Diagnostic Medicine/Pathobiology  
Veterinary Diagnostic Lab

## Research Centers

Agricultural Research Center–Hays  
Horticulture and Forestry Research-Extension Center  
John C. Pair Horticultural Center  
Northwest Research-Extension Center  
Southeast Agricultural Research Center  
Southwest Research-Extension Center

## Experiment Fields

East Central - Ottawa  
Kansas River Valley - Rossville, Silver Lake  
North Central - Belleville  
Pecan Field - Chetopa  
South Central - Hutchinson

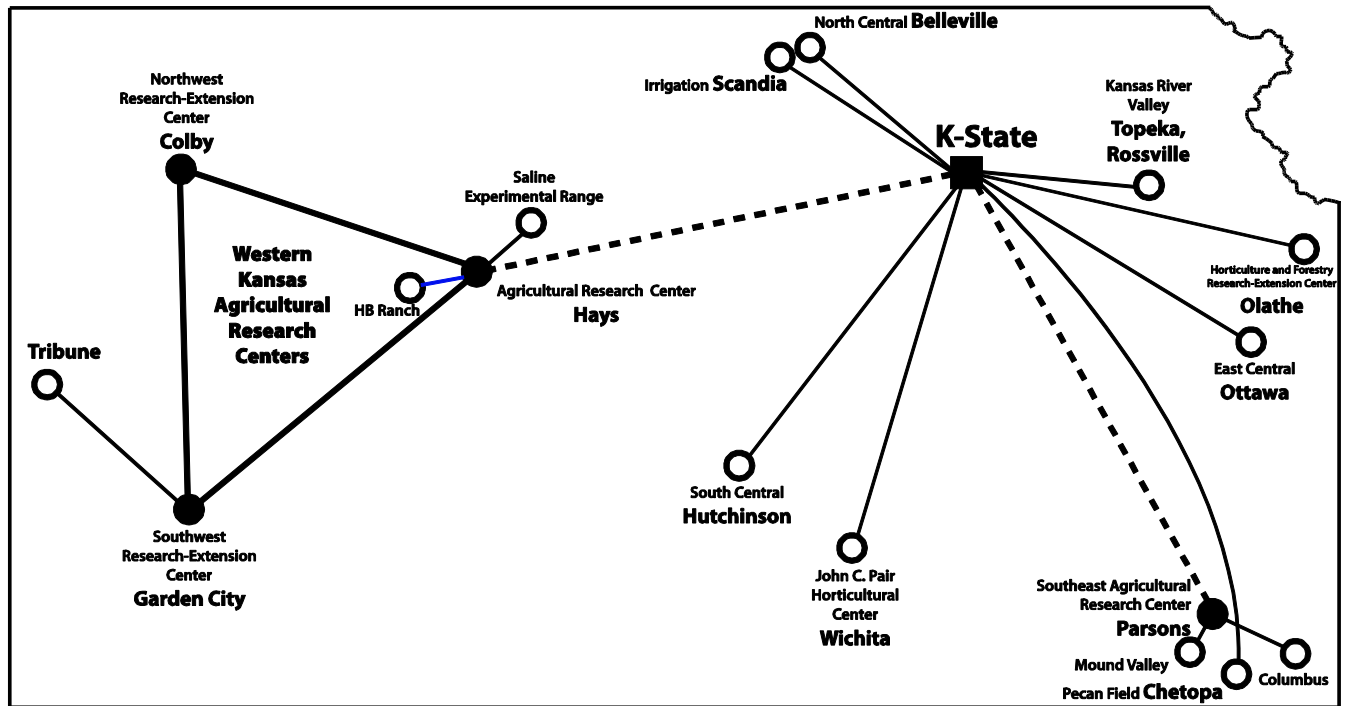
## Associated Programs

Bioprocessing and Industrial Value-Added Program  
Center for Animal Identification  
Center for Biobased Products by Design  
Center for Sustainable Energy  
Food Science Institute  
Great Plains Diagnostic Network  
Great Plains Sorghum Improvement and Utilization Center  
Kansas Agriculture and Rural Leadership  
Kansas Center for Agricultural Resources and the Environment  
Kansas Center for Sustainable Agriculture and Alternative Crops  
Kansas Water Resources Institute  
Konza Prairie Biological Station  
International Grains Program  
International Meat and Livestock Program  
Plant Biotechnology Center  
Weather Data Library  
Wheat Genetic and Genomic Resources Center

\* List includes units having faculty with KAES appointments in fiscal year 2011. For a full list of departments and programs of the Kansas State University Agricultural Experiment Station and Cooperative Extension Service and for additional information on K-State Research and Extension, see [www.ksre.ksu.edu](http://www.ksre.ksu.edu), and click on “About Us” in the sidebar.



# Kansas State University Agricultural Research Locations



## Station Publications

### Reports of Progress

- SRP 1035 K-State Turfgrass Research 2010  
SRP 1036 2009 Kansas Performance Tests with Winter Wheat Varieties  
SRP 1037 2009 Kansas Performance Tests with Corn Hybrids  
SRP 1038 Swine Day 2010  
SRP 1039 Dairy Research 2010  
SRP 1040 2010 Kansas Performance Tests with Soybean Varieties  
SRP 1041 2010 Kansas Performance Tests with Grain Sorghum Hybrids  
SRP 1042 2010 Kansas Performance Tests with Sunflower Hybrids  
SRP 1043 2010 Kansas Performance Tests with Alfalfa Varieties  
SRP 1044 2010 National Winter Canola Variety Trial  
SRP 1045 2011 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland  
SRP 1046 2010 Kansas Performance Tests with Cotton Varieties  
SRP 1047 Cattlemen's Day 2011  
SRP 1048 Field Research 2011  
SRP 1049 Kansas Fertilizer Research 2010  
SRP 1050 Roundup 2011, ARC-Hays  
SRP 1051 2010 Agricultural Research, Southeast Agricultural Research Center  
SRP 1052 Field Day 2010, Southwest Research-Extension Center

### Special Publications

- DRR10 Director's report of research in Kansas 2010

#### Suffix Letters for Contribution Numbers

- 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:  
[www.ksre.ksu.edu/library](http://www.ksre.ksu.edu/library)

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, visit <http://dx.doi.org/>.

## Publications of Station Scientists

Manuscripts are listed by unit and contribution number, and are cross-listed under all relevant units according to authors' affiliations and appointments (i.e., Kansas Agricultural Experiment Station tenths).

## Administration

DRR10 Director's report of research in Kansas  
2010  
May 2011, 47 pp. (electronic only)  
<http://ksre.ksu.edu/library/p.aspx?tabid=40drr10.pdf>

## Agricultural Economics

10-290-J From farm management to agricultural and applied economics: The expansion of a professional society as seen through a census of its dissertations from 1951 to 2005  
M. Boland, J. Crespi  
Applied Economic Perspectives and Policy, 32(3):456-471, 2010

11-039-D Kansas farm management SAS data bank documentation  
M.R. Langemeier  
Agricultural Economics Staff Paper no. 11-01, 2010, 110 pp.

11-040-D Comparison of 2007 census and KFMA farms  
M. Langemeier  
Agricultural Economics Staff Paper no. 11-02, 2010, 17 pp.

11-127-D 2010 fence material and construction cost survey in Kansas  
J.B. Schlegel, L.J. Tsoodle  
Agricultural Economics Staff Paper no. 11-03, 2010, 4 pp.

11-258-D 2010 pasture leasing arrangements in Kansas  
J.B. Schlegel, L.J. Tsoodle  
Agricultural Economics Staff Paper no. 11-05, 2011, 14 pp.

11-269-J Productive efficiency in the Middle East and North America  
M. Zaher, A.M. Featherstone  
Applied Economics, 42(7):899-915, 2010

11-271-J Predicting credit default: Comparative results from an artificial neural network, logistic regression and adaptive neuro-fuzzy inference system  
O.O. Odeh, A.M. Featherstone, S. Das  
International Research Journal of Finance and Economics, 42:7-18, 2010

11-272-J The genetic and economic impact of the CIMMYT wheat breeding program on local producers in the Yaqui Valley, Sonora Mexico  
L.L. Nalley, A.P. Barkley, A.M. Featherstone  
Agricultural Economics, 41(5):453-462, 2010

11-273-J Reliability of statistical software  
O.O. Odeh, A.M. Featherstone, J.S. Bergtold  
American Journal of Agricultural Economics, 92(5):1472-1489, 2010

11-274-J Risk behavior in the presence of government programs  
T. Serra, B.K. Goodwin, A.M. Featherstone  
Journal of Econometrics, 162(1):18-24, 2011

## Agronomy

06-365-J NEXRAD stage III precipitation local bias adjustment for streamflow prediction  
P. Tuppad, K.R. Mankin, J.K. Koeliker, J.M.S. Hutchinson, M.C. Knapp  
Transactions of the ASABE, 53(5):1511-1520, 2010

08-166-B Water conservation for agriculture  
P.W. Unger, M.B. Kirkham, D.C. Nielsen  
In: Advances in Soil and Water Conservation, T.M. Zobeck, W.F. Schillinger (Eds.).  
Soil Science Society of America Special Publication 60, 2010

09-068-J Primary and residual effects of Abrams tank traffic on prairie soil properties  
P.S. Althoff, S.J. Thien, T.C. Todd  
Soil Science Society of America Journal, 74(6):2151-2161, 2010

09-083-B Water dynamics in soils  
M.B. Kirkham  
In: Soil management: Building a stable base for agriculture, J.L. Hatfield, T.J. Sauer (Eds.). Madison, WI: Soil Science Society of America, pp. 53-66, 2011

- 09-161-J Modeling and mapping QTL for senescence-related traits in winter wheat under high temperature  
K. Vijayalakshmi, B.S. Gill, A.K. Fritz, G. Bai, S. Pandravada, G.M. Paulsen  
Molecular Breeding, 26(2):163-175, 2010
- 09-183-J Longevity and temperature response of pollen as affected by elevated growth temperature and carbon dioxide in peanut and grain sorghum  
P.V.V. Prasad, K.J. Boote, L.H. Allen, Jr.  
Environmental and Experimental Botany, 70(1):51-57, 2011
- 09-263-B Ethanol from grain crops  
R. Zhao, X. Wu, S. Bean, D. Wang  
In: Industrial crops and uses, B.P. Singh (Ed.).  
Cambridge, MA: CAB International, pp. 84-103, 2010
- 09-347-J Features of fermentation performance of sweet sorghum juice after harvest  
X. Wu, S. Staggenborg, J.L. Propheter, J. Yu, W.L. Rooney, D. Wang  
Journal of Industrial Microbiology and Biotechnology, 101(1):1220-1226, 2010
- 09-345-J Dissection of genetic components of preharvest sprouting resistance in white wheat  
S. Liu, G. Bai, S. Cai, C. Chen  
Molecular Breeding, 27(4):511-523, 2011
- 10-025-J Simulation of kernel number and yield using CERES-Maize 3.51  
A.A. James, R.L. Vanderlip, S. Welch  
Agronomy Journal, 2010
- 10-059-J Response of acetolactate synthase-resistant grain sorghum to nicosulfuron plus rimsulfuron  
D.S. Hennigh, K. Al-Khatib, M.R. Tuinstra  
Weed Technology, 24(4):411-415, 2010
- 10-063-A Optimizing water use with high-transpiration-efficiency plants  
P.A. Thevar, M.B. Kirkham, R.M. Aiken, K.D. Kofoid, Z. Xin  
Proceedings of the 19th World Congress of Soil Science  
Brisbane, Australia, 2010
- 10-075-J Weed control with selected herbicides in acetolactate synthase-resistant sorghum  
D.S. Hennigh, K. Al-Khatib, M.R. Tuinstra, R.S. Currie, P.W. Geier, P.W. Stahlman, M.W. Claassen  
Crop Protection, 29(8):879-883, 2010
- 10-081-J Response of barnyardgrass (*Echinochloa crus-galli*), green foxtail (*Setaria viridis*), longspine sandbur (*Cenchrus longispinus*), and large crabgrass (*Digitaria sanguinalis*) to nicosulfuron and rimsulfuron  
D.S. Hennigh, K. Al-Khatib  
Weed Science, 58(3):189-194, 2010
- 10-093-J Impacts of deficit irrigation on carbon sequestration and soil physical properties under no-till  
H. Blanco-Canqui, N.L. Klocke, A.J. Schlegel, L.R. Stone, C.W. Rice  
Soil Science Society of America Journal, 74(4):1301-1309, 2010
- 10-122-J Continuous cropping systems reduce near-surface maximum compaction in no-till soils  
H. Blanco-Canqui, L.R. Stone, A.J. Schlegel, J.G. Benjamin, M.F. Vigil, P.W. Stahlman  
Agronomy Journal, 102(4):1217-1225, 2010
- 10-147-A Genetic resources, breeding and production of millets in Ethiopia  
E. Degu, A. Adugna, T. Tadesse, T. Tesso  
Proceedings of International Workshop on New Approaches to Plant Breeding of Orphan Crops in Africa  
Bern, Switzerland, 2007, pp. 43-56
- 10-166-J Genetic diversity, population structure, and linkage disequilibrium in U.S. elite winter wheat  
D. Zhang, G. Bai, C. Zhu, J. Yu, B.F. Carver  
Plant Genome, 3(2):117-127, 2010
- 10-186-J Field-level targeting using SWAT: Mapping output from HRUs to fields and assessing limitations of GIS input data  
P. Daggupati, K.R. Douglas-Mankin, A.Y. Sheshukov, P.L. Barnes, D.L. Devlin  
Transactions of the ASABE, 54(2):501-514, 2011
- 10-191-J Effect of tillage on the hydrology of a claypan soil in Kansas  
M.E. Buckley, G.J. Kluitenberg, D.W. Sweeney, K.W. Kelley, L.R. Stone  
Soil Science Society of America Journal, 74(6):2109-2119, 2010

- 10-219-J Analysis of host plant resistance to multiple *Fusarium* species associated with stalk rot disease in sorghum [*Sorghum bicolor* (L.) Moench]  
T.T. Tesso, C.R. Little, N. Ochanda, L. Clafin, M.R. Tuinstra  
Field Crops Research, 118(2):177-182, 2010
- 10-232-J Controlled traffic impacts on physical and hydraulic properties in an intensively cropped no-till soil  
H. Blanco-Canqui, M.M. Claassen, L.R. Stone  
Soil Science Society of America Journal, 74(6):2142-2150, 2010
- 10-246-J Selenium protects sorghum leaves from oxidative damage under high temperature stress by enhancing antioxidant defense system  
M. Djanaguiraman, P.V.V. Prasad, M. Seppanen  
Plant Physiology and Biochemistry, 48(12):999-1007, 2010
- 10-251-J Stalk strength and reaction to infection by *Macrophomina phaseolina* of brown midrib maize (*Zea mays*) and sorghum (*Sorghum bicolor*)  
T. Tesso, G. Ejeta  
Field Crops Research, 120(2):271-275, 2011
- 10-253-J Ethylene perception inhibitor 1-MCP decreases oxidative damage of leaves through enhanced antioxidant defense mechanisms in soybean plants grown under high temperature stress  
M. Djanaguiraman, P.V.V. Prasad, K. Al-Khatib  
Environmental and Experimental Botany, 71(2):215-223, 2011
- 10-256-J Analysis of induction and establishment of dwarf bunt of wheat under marginal climatic conditions  
B.J. Goates, G.L. Peterson, R.L. Bowden, L. Maddux  
Plant Disease, 95(4):478-484, 2011
- 10-271-J Registration of 34 sorghum germplasm lines resistant to acetolactate synthase inhibitor herbicides  
T.T. Tesso, K. Kershner, N. Ochanda, K. Al-Khatib, M.R. Tuinstra  
Journal of Plant Registrations, 5(2):215-219, 2011
- 10-276-J Equations for drainage component of the field water balance  
L.R. Stone, N.L. Klocke, A.J. Schlegel, F.R. Lamm, D.J. Tomsicek  
Applied Engineering in Agriculture, 27(3):345-350, 2011
- 10-283-J Modeling nutrient runoff yields from combined in-field crop management practices using SWAT  
K.R. Douglas-Mankin, D. Maski, K.A. Janssen, P. Tuppad, G.M. Pierzynski  
Transactions of the ASABE, 53(5):1557-1568, 2010
- 10-284-J Phosphorus adsorption and desorption potential of stream sediments and field soils in agricultural watersheds  
S.C. Agudelo, N.O. Nelson, P.L. Barnes, T. Keane, G.M. Pierzynski  
Journal of Environmental Quality, 40(1):144-152, 2011
- 10-285-J Dissection and fine mapping of a major QTL for preharvest sprouting resistance in white wheat Rio Blanco  
S.B. Liu, G.H. Bai  
Theoretical and Applied Genetics, 121(8):1395-1404, 2010  
doi:10.1007/s00122-010-1396-4
- 10-303-J Changes in microbial properties after manure, lime, and bentonite application to a heavy metal-contaminated mine waste  
L.R. Baker, P.M. White, G.M. Pierzynski  
Applied Soil Ecology, 48(1):1-10, 2011
- 10-304-J Wheat gene expression is differentially affected by a virulent Russian wheat aphid biotype  
X. Liu, J. Meng, S. Starkey, C.M. Smith  
Journal of Chemical Ecology, 37(5):472-482, 2011
- 10-306-J Chromosome size in diploid eukaryotic species centers on the average length with a conserved boundary  
X. Li, C. Zhu, Z. Lin, Y. Wu, D. Zhang, W. Song, G. Bai, M. Scanlon, M. Zhang, J. Yu  
Molecular Biology and Evolution, 28:1901-191, 2011
- 10-309-J Hydrothermal conversion of corn cobs and crude glycerol  
J. Gan, W. Yuan, N.O. Nelson, S.C. Agudelo  
Biological Engineering, 2(4):197-210, 2010

- 10-313-J Genetic variability of transpiration response to vapor pressure deficit among sorghum genotypes  
M. Gholipoor, P.V.V. Prasad, R.N. Mutava, T.R. Sinclair  
Field Crops Research, 119(1):85-90, 2010
- 10-328-J Release of dissolved cadmium and sulfur nanoparticles from oxidizing sulfide minerals  
J. de Livera, M.J. McLaughlin, D. Beak, G.M. Hettiarachchi, J. Kirby  
Soil Science Society of America Journal, 75(3):842-854, 2011
- 10-344-J Association between morphological traits and yield components in the durra sorghums of Ethiopia  
T. Tesso, A. Tirfess, H. Mohammed  
Hereditas, 148(3):98-109, 2011
- 10-356-J Cadmium solubility in paddy soils: Effects of soil oxidation, metal sulfides and competitive ions  
J. de Livera, M.J. McLaughlin, G.M. Hettiarachchi, J.K. Kirby, D.G. Beak  
Science of the Total Environment, 409(8):1489-1497, 2011
- 10-366-B Impacts of high temperature stress and potential opportunities for breeding  
R.P. Singh, P.V.V. Prasad, A.K. Sharma, K.R. Reddy  
In: Crop Adaptation to Climate Change, S.S. Yadav, J.L. Hatfield, R. Redden, H. Lotze-Campen, A. Hall (Eds.).  
West Sussex, UK: John Wiley and Sons, pp. 166-185, 2011
- 10-372-J Pyroxasulfone with and without sulfentrazone in sunflower (*Helianthus annuus*)  
B.L.S. Olson, R.K. Zollinger, C.R. Thompson, D.E. Peterson, B. Jenks, M. Moechnig, P.W. Stahlman  
Weed Technology, 25(2):217-221, 2011
- 11-012-S 2010 Kansas Performance Tests with Winter Wheat Varieties  
Multiple authors  
Coordinating author: J. Lingenfelter  
SRP 1036, August 2010
- 11-032-J Single nucleotide polymorphism in wheat chromosome region harboring *Fhb1* for Fusarium head blight resistance  
A. Bernado, D. Zhang, H. Ma, G. Bai  
Theoretical and Applied Genetics, 29(2):477-488, 2011  
doi:10.1007/s11032-011-9565-y
- 11-038-J Physical properties of pellets made from sorghum stalk, corn stover, wheat straw, and big bluestem  
K. Theerarattananoon, F. Xu, J. Wilson, R. Ballard, L. Mickinney, S. Staggenborg, P. Vadlani, J.Z. Pei, D. Wang  
Industrial Crops and Products, 33(2):325-332, 2011
- 11-041-J Resistance to tan spot and insensitivity to Ptr ToxA in wheat  
A.J. Noriel, X. Sun, W. Bockus, G. Bai  
Crop Science, 51(3):1059-1067, 2011
- 11-042-J Cobalt distribution and speciation: Effect of aging, intermittent submergence and in situ rice roots  
D.G. Beak, J.K. Kirby, G.M. Hettiarachchi, L.A. Wendling, M.J. McLaughlin, R. Khatiwanda  
Journal of Environmental Quality, 40(3):679-695, 2010
- 11-045-J Reclamation of abandoned swine lagoon soils using hybrid poplar in a greenhouse soil-column study  
K.R. Doulgas-Mankin, K. Precht, M.B. Kirkham, S.L. Hutchinson  
International Journal of Agricultural and Biological Engineering, 3(4):44-51, 2010
- 11-050-J A novel quantitative trait locus for Fusarium head blight resistance in chromosome 7A of wheat  
D.V. Jayatilake, G.H. Bai, Y.H. Dong  
Theoretical and Applied Genetics, 122(6):1189-1198, 2011
- 11-051-J Nitrogen and phosphorus availability in biochar amended soils  
N.O. Nelson, S.C. Agudelo, W. Yuan, J. Gan  
Soil Science, 176(5):218-226, 2011  
doi:10.1097/SS.0b013e3182171eac
- 11-058-J From dawn to dawn – China’s journey to agricultural self-sufficiency  
M.B. Kirkham, G.H. Liang  
Journal of Environmental Quality, 39(5):1864-1865, 2011

- 11-059-B Elevated carbon dioxide: Impacts on soil and plant water relations  
M.B. Kirkham  
Boca Raton, Florida: CRC Press, 399 pp., 2011
- 11-073-J Cadmium solubility in paddy soils: effects of soil oxidation, sulfide equilibria and competitive ions  
J. de Livera, M.J. McLaughlin, G.M. Hettiarachchi, J.K. Kirby, D.G. Beak  
Science of the Total Environment, 409(8):1489-1497, 2011
- 11-111-J Multivariate analysis of maize disease resistances suggests a pleiotropic genetic basis and implicates a glutathione S-transferase gene  
R.J. Wisser, J.M. Kolkman, M.E. Patzoldt, J.B. Holland, J. Yu, M. Krakowsky, R.J. Nelson, P.J. Balint-Kurti  
Proceedings of National Academy of Sciences, 108(18):7339-7344, 2011
- 11-112-J Evaluation of drought and heat-stressed grain sorghum (*Sorghum bicolor*) for biofuel production  
N. Ananda, P.V. Vadlani, P.V. Vara Prasad  
Industrial Crops and Products, 33(3):779-782, 2011
- 11-119-J Effects of Planting Date and Tillage on Winter Canola  
J. Holman, S. Maxwell, M. Stamm, K. Martin  
Crop Management, 2011  
doi:10.1094/CM-2011-0324-01-RS
- 11-120-J Utilization of dry distillers grains and charcoal as nitrogen fertilizer in corn  
K.J. Shroyer, S.A. Staggenborg, J. Propheter  
Agronomy Journal, 103(5):1321-1328, 2011
- 11-130-S 2010 Kansas Performance Tests with Corn Hybrids  
Multiple authors  
Coordinating author: J. Lingenfelser  
SRP 1037, November 2010
- 11-131-S 2011 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland  
Multiple authors  
Coordinating author: C.R. Thompson  
KS Agric. Exp. Stn. Report of Prog. 1045, January 2011
- 11-134-S 2010 Kansas Performance Tests with Soybean Varieties  
Multiple authors  
Coordinating author: W.T. Schapaugh  
KS Agric. Exp. Stn. Report of Prog. 1040, December 2010
- 11-144-S 2010 Kansas Performance Tests with Grain Sorghum  
Multiple authors  
Coordinating author: J. Lingenfelser  
KS Agric. Exp. Stn. Report of Prog. 1041, December 2010
- 11-165-T 2010 National Winter Canola Variety Trial  
Multiple authors  
Coordinating author: M. Stamm  
KS Agric. Exp. Stn. Report of Prog. 1044, January 2011
- 11-180-J Quantitative trait loci for resistance to fusarium head blight in a Chinese wheat landrace Haiyanzhong  
T. Li, G. Bai, S. Wu, S. Gu  
Theoretical and Applied Genetics, 122(8):1497-1502, 2011  
doi:10.1007/s00122-011-1549-0
- 11-184-S 2010 Kansas Performance Tests with Sunflower Hybrids  
Multiple authors  
Coordinating author: P. Evans  
SRP 1042, January 2011
- 11-190-J Advanced in situ spectroscopic techniques and their applications in environmental biogeochemistry: Introduction to the special section  
E. Lombi, G.M. Hettiarachchi, K.G. Scheckel  
Journal of Environmental Quality, 40(3):659-666, 2011
- 11-217-J Volunteer glyphosate-tolerant corn reduces soil water storage and winter wheat yields  
A. Schlegel, B. Olson, S. Maxwell, K. Martin  
Plant Management Network, 2011
- 11-220-J Association study of resistance to soilborne wheat mosaic virus in U.S. winter wheat  
D. Zhang, G. Bai, R.M. Hunger, W.W. Bockus, J. Yu, B.F. Carver, G. Brown-Guedira  
Phytopathology, 101(11):1322-1329, 2011

- 11-223-S Field Research 2011  
Multiple authors  
KS Agric. Exp. Stn. Report of Prog. 1048,  
April 2011
- 11-224-S Kansas Fertilizer Research 2010  
Multiple authors  
KS Agric. Exp. Stn. Report of Prog. 1049,  
April 2011
- 11-259-S 2010 Kansas Performance Tests with Cotton  
Varieties  
Multiple authors  
Coordinating author: S. Staggenborg  
KS Agric. Exp. Stn. Report of Prog. 1046,  
March 2011
- 11-306-S Agricultural Research 2011  
Multiple authors  
Coordinating author: L. Lomas  
KS Agric. Exp. Stn. Report of Prog. 1051,  
April 2011
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# DIRECTOR'S REPORT OF RESEARCH IN KANSAS 2011

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