Title:
IMPACT OF FERTILIZATION RATE AND HARVEST MANAGEMENT ON COOL-SEASON GRASS HAY YIELDS, FORAGE QUALITY, AND HAY PRODUCTION ECONOMICS

Investigators:

Objectives, including relevance of project to Missouri fertilizer / lime use:
A previous localized research/demonstration project in Central Missouri illustrated the increase in forage yield and economic value of following MU Soil Testing Laboratory recommendations. Surveys indicate local producers value MU Extension Regional Specialists conducting these projects and change their production management practices based on results of these projects (Missouri Soil Fertility and Fertilizers Research Update 2010, Agronomy Miscellaneous Publ. #11-01, January 2011).

Producers are reluctant, for many reasons, to aggressively harvest hay in early- to mid-May. Many producers delay hay harvest until late-June or early July. At this time, hay quality has declined and regrowth potential has been drastically reduced. The previous project emphasized the importance of timely, early season harvest of cool-season grass hay crops. Early season harvest helps ensure high forage quality which reduces the need of additional nutritional supplementation to livestock. It also facilitates additional harvest opportunities by either hay production or grazing.

The previous project did not answer questions about forage yield, forage quality and hay production economics if hay is aggressively harvested (mid-May, August and November) compared to a more lax harvest schedule (late-June and November). As fertilizer prices increase, it is important to make sure the dollar investment in fertilizer is captured.

Will an aggressive hay harvest management strategy capture more of the fertilizer investment than a lax harvest management system? This is what we would like to investigate.

Our objectives are: (1) To determine forage yield, quality and economic performance of two different hay harvest systems using proven fertilizer strategies, and (2) Evaluate the use of ultrasonic forage yield equipment in hay production systems.

Procedures:
The research will be conducted on the previously used site. Fertilizer treatments will be 0-0-0, 50-30-0 or 100-65-60. These treatments were the highest yielding or showed yield response to P in the previous study. Harvest treatments will be either two (late-June and November) or three (mid-May, August and November) annual harvests. Red clover treatments will also be evaluated at two fertilizer levels, 0-0-0 or 0-65-60 with two or three annual harvests. We will collect information on the percentage of red clover in the forage stand. Plots will be measured bi-weekly with an ATV mounted ultrasonic forage measurement system to evaluate this technology as a management tool in pasture and hay production.
At each harvest, sub-samples will be collected and analyzed for nutrient content. Actual yields will be compared to yield estimates from the ultrasonic forage measurement system. Forage growth rate will be closely monitored throughout the growing season. Data will be statistically analyzed in order to accurately compare the fertilizer and hay harvest treatments.

Field days will be conducted annually for the duration of the grant to provide demonstrations of proven research based concepts. These concepts will include but not be limited to: soil testing, liming, fertilizer materials, fertilization timing, forage harvest timing, grazing heights, extended grazing using legumes, grazing frequency, environmental quality and economic benefit of implementing these practices.

By using the same field as was used in the previous 2007 to 2009 study, the opportunity exists to evaluate the long-term benefits of lime application to low pH soils. Eight replicates per treatment will be utilized and are based on the 2007 application of lime in the previous study where four plots per treatment received lime and four plots were not limed.

Current status / importance of research area:
This project builds on previous work at this site, both from a physical standpoint due to the ability to use the same plot area and from the standpoint of producer acceptance and support of our work in this area.

Hay producers are facing large fertilizer outlays if they are to achieve adequate yields and maintain soil fertility. It is imperative they capture as much value from their fertilizer dollars as possible. There is a need to evaluate the amount of forage grown during late spring that is lost by first cutting delays, either due to weather, management preferences or producer habit.

If aggressive early-season hay harvest increases total forage production and total nutrient production for livestock use, then more dollars of the fertilizer investment can be recaptured. If this increase in yield is large enough, it may encourage producers to opt for conserving the first cutting as haylage, thus reducing some of the weather and other management concerns they legitimately have.

Hay producers are in competition for land resources. Many hay producers also own livestock herds. Fertilization improves per acre hay yields and thus reduces the number of acres a livestock producer needs to harvest in order to meet the hay needs of their herd. Results from our previous study on this site indicated 20% to 60% more acres needed to be harvested to achieve hay yields equal to the per acre yields achieved by the highest fertilizer level (100-65-60). If a producer chooses not to fertilize, more land must be acquired, additional feed must be purchased or livestock numbers must be reduced. These costs must be accounted for by each producer.

This relationship between production capability due to fertilization and land costs may become more important in future years as land costs rise and hay and pasture land availability shrink. Producers may come to the conclusion that it is more cost effective to apply appropriate amounts of fertilizer and increase per acre yields than to try to find access to additional land resources.
producing marginal amounts of forage. Improved per acre forage yields also means less acres hay harvest equipment must cover with a potential reduction in fuel usage and machine repairs. This study should help evaluate these concepts.

Expected economic impact:
Based on previous work at this location and producer surveys at project field days, if hay is valued at $60 per ton, producers could realize an additional $25 to $65 income per acre by applying fertilizer according to MU Soil Testing Laboratory soil test recommendations compared to the other fertilizer treatments in the study. In the 14 county central Missouri region, the potential added value to producers is between $3.2 and $8.4 million, based on the number of hay acres in the region and survey results from field day participants.

Timetable for proposed research:
2012
Soil test
Apply fertilizer treatments
Spray for broadleaf weed, legume control
Seed red clover
Forage measurements, forage harvest, forage quality analysis, data analysis
Field days

2013
Repeat fertilizer application, red clover seeding, harvest, forage sampling and data analysis
Field days

2014
Finalize data analysis and publish outcomes
Field days

Strategy for application / transfer of knowledge:
Our greatest tool will be field and demonstration days, work-shops and on-farm outreach seminars. Pasture walks or twilight tours during the summer months have been effective in disseminating research findings and research results. Educational information will also be distributed through publications of our regional newsletter “Ag Connection”, and press releases to local newspapers and radio outlets. Presentations will also be made at national meetings of the National Association of County Agricultural Agents.

The evaluation plan for this project will include presentation pre-and post-test for producers participating in our workshops related to their knowledge of the specific topic areas. A follow-up survey will be mailed to the participants to evaluate long-term behavioral changes to their management practices for economic impact analysis.

We appreciate your consideration of this grant.
Proposed budget by years and category: salaries / operating / equipment / other

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>2012</th>
<th>2012</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>Purchase, application</td>
<td>325</td>
<td>325</td>
<td>0</td>
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<tr>
<td>Seed</td>
<td>Red clover seeding</td>
<td>25</td>
<td>25</td>
<td>0</td>
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<tr>
<td>Forage Harvest</td>
<td>Equipment use, labor</td>
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<td>2,500</td>
<td>0</td>
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<tr>
<td>Lab fees</td>
<td>Forage analysis</td>
<td>4,600</td>
<td>4,600</td>
<td>0</td>
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<tr>
<td>Field Days</td>
<td>Materials, refreshments</td>
<td>500</td>
<td>500</td>
<td>500</td>
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<tr>
<td>Mileage</td>
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<td>500</td>
<td>500</td>
<td>250</td>
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<tr>
<td>Supplies</td>
<td>Bags, markers, signs</td>
<td>200</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Publication</td>
<td>Printing, postage</td>
<td>200</td>
<td>200</td>
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</tr>
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</table>

|               | Sub-total By year            | $8,850| $8,850| $1,050|
| Support Salary | 25% of above total           | $2,212| $2,212| $262 |
| Grant Total    | By year                      | $11,062| $11,062| $1,312|
| Three-year total|                             | $23,436|
Eugene G. Schmitz
Benton County Extension Center 26606 Ancient Cedar Drive
1220 Commercial Street Warsaw, MO 65355
Warsaw, MO 65355 (660) 438-2776
(660) 438-5012 schmitze@missouri.edu

Present Position – October 2004 to present
University of Missouri Extension Livestock Specialist serving Benton, Pettis, Cooper, Morgan and Moniteau Counties.

Programming Efforts in Central Missouri

- Beef cattle nutrition and management, primarily cow-calf production.
- Pasture and forage management and utilization.
  - Conducting bermudagrass variety, yield and quality demonstrations.
  - Conducting fall Nitrogen fertility demonstrations with tall fescue.
- Regional grazing schools in Central Missouri in cooperation with NRCS personnel.
- Show-Me-Select Replacement Heifer Development Program in Central Missouri.

Past Position – February 2003 to October 2004
Colorado State University Cooperative Extension Livestock Agent
Golden Plains Area – Yuma, Kit Carson, Phillips and Washington Counties

Responsibilities:
- Provide educational assistance to citizens of Northeast Colorado.
- Assist livestock producers through educational programming, on-farm consultations and research activities.
  - Special emphasis has been on irrigated cool-season forage selection and management and irrigated legume demonstration plots.
  - W-SARE grant obtained for irrigated forage education program.
- Assist other Extension staff and related agencies as needed.

Past Position – April 1995 to January 2003
University Outreach and Extension Livestock Specialist serving Mercer, Grundy, Livingston and Caldwell Counties in Northwest Missouri

Programming Efforts in NW Missouri

- Beef cattle nutrition and management, primarily cow-calf production.
- Pasture and forage management and utilization.
  - Conducted fall grazing demonstrations utilizing stockpiled tall fescue pastures.
Conducted research evaluating fall nitrogen fertilization programs for tall fescue pastures.

- Show-Me-Select Replacement Heifer Development Program in NW Missouri.
- Green Hills Premier Beef Marketing program.
- Northwest Missouri Performance Testing Program and Bull Sale.
- Swine and dairy nutrient management planning.
- Regional grazing schools in NW Missouri in cooperation with NRCS personnel.
- Grassland Evaluation Contests for area high school Vo-Ag departments in cooperation with NRCS and Missouri Department of Conservation.

Education

Associate of Arts – Colby Community College, Colby, KS – May 1980
B.S. – Animal Science – Kansas State University, Manhattan, KS – May 1982

Areas of Research
- Effects of various number of paddocks and stocking rates on steer and pasture performance in North Missouri.
- Evaluation of whole cottonseed as an energy-protein supplement for gestating beef cows

Professional and Community Memberships and Awards

- 2008. University of Missouri Extension Outstanding Agriculture Specialist Award.
- National Association of County Agricultural Agents, 2003 – present
- Missouri Agricultural Extension Professionals, 2004 – present
- Benton County Soil and Water Conservation District Board of Supervisors
- Benton County Cattlemen’s Association

Past Work Experience

- Extension Associate II – 1990 and 1991 – Iowa State University, Agronomy Extension. Coordinated 22 on-farm pasture and forage management demonstrations relating to establishment, maintenance and utilization of forage resources in South Central Iowa.
• Graduate Research Assistant – 1987 through 1989 at the University of Missouri – Columbia.
• Feed mill and grain elevator superintendent – 1984 through 1987 at Hackney Farmers Union Coop, Winfield, KS.
• Sales representative – 1982 through 1984 for Vigortone Ag Products in Central Kansas.

Other relevant experience

• Raised on farm at Leoti, KS.
• General farm and ranch labor during college at Manhattan, KS.
• Sales experience, wholesale and retail.
• Personal computers – Microsoft (Word, Excel, PowerPoint, etc.), ration formulation programs, cattle record keeping programs.

Oral Presentations

Posters and Presentations at National Meetings


Abstracts


Technical Reports


D. Kent Shannon

Work Address
1012 N. Highway UU
Columbia, MO 65203
573-445-9792

Home Address
12901 East Hwy FF
Centralia, MO 65240
573-682-9990

SUMMARY OF QUALIFICATIONS

· Have a practical knowledge of agricultural production.
· Have developed educational programs with the goal of improving agricultural profitability.
· Have a good ability to work with others.
· Take pride in a job well done.
· Willing to learn, so as to broaden my knowledge as an agricultural engineer.

RELEVANT EXPERIENCE

Helped Missouri citizens turn knowledge into know-how as a Regional Extension Agricultural Engineering Specialist.

- Developed educational programs for agricultural producers in the following areas: farm safety, water quality issues, no-till crop production, proper pesticide application, and the design of cattle handling facilities.
- On-farm consultations in the following areas of animal waste management, livestock buildings, livestock watering systems, and moisture problems in homes as well as other related areas of agricultural engineering.
- Developed educational programs for youth in the areas of farm safety and water quality.
- Served as county 4-H computer project leader educating youth on the use of the INTERNET.

· Served as Associate Director of the Missouri Precision Agriculture Center.
  - Have developed educational programs on using GPS receivers, yield monitors, GIS software relating to precision agriculture, as well as, overall basic concepts of precision farming for regional meetings and field days.
  - Have worked with regional extension specialists in developing educational programs tailored to the various needs of producers in different parts of Missouri.
  - Have worked with local cooperators on demonstration/research projects to better understand precision agriculture techniques such as variable rate seeding and variable rate nitrogen management.
  - Have hands-on experience with various precision agriculture technologies such as GPS receivers and yield monitors.

· Worked along with my dad and brother on the family farm.
  - Operation consisted of backgrounding about 100 feeder cattle a year, 600 acres of row crops, and 150 acres of hay.
  - Rented 40 acres for row crop production and feed 25 feeder steers for my project while a member of the FFA.
### EMPLOYMENT HISTORY

<table>
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<th>Year</th>
<th>Position and Company</th>
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<tr>
<td>2008 to present</td>
<td>University of Missouri Extension Natural Resource Engineering Specialist, University of Missouri System-Boone County, Columbia, Missouri</td>
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<tr>
<td>1998 to 2008</td>
<td>Associate Director of the Missouri Precision Agriculture Center, University of Missouri-Columbia, Columbia, Missouri</td>
</tr>
<tr>
<td>1992 to 1998</td>
<td>University Outreach and Extension Agricultural Engineering Specialist, University of Missouri System-Adair County, Kirksville, Missouri</td>
</tr>
<tr>
<td>1991 to 1992</td>
<td>Graduate Student, University of Missouri-Columbia, Missouri</td>
</tr>
<tr>
<td>Summer of 1990-1991</td>
<td>Extension Associate, University of Missouri-Portageville, Missouri</td>
</tr>
<tr>
<td>Summers of 1987, 88 and 89</td>
<td>Brush Crew Laborer, Macon Electric Cooperative-Macon, Missouri</td>
</tr>
<tr>
<td>1982-90</td>
<td>Helped work on family farm, Larry Shannon Farms-Anabel, MO</td>
</tr>
</tbody>
</table>

### EDUCATION

- M.S., Agricultural Engineering, University of Missouri, May 1993
- B.S., Agricultural Engineering, University of Missouri, December 1990

### PROFESSIONAL AND COMMUNITY INVOLVEMENT

American Society of Agricultural Engineers, served as President, Vice President, Secretary, and Parliamentarian of the Student Branch-University of Missouri. Honored at Mid-Central Conference in the Student Paper Contest 1990. Honored as Young Member of the Year of the Missouri Section of the American Society of Agricultural Engineers 1997. Honored as with the Achievement Award from the Missouri Agriculture Extension Professionals 2001.

Member of Ten Mile Baptist Church, Anabel, MO, served as Sunday School Superintendent for 5 years.
Selected Publications


Abstracts and Professional Presentations


Extension Publication Guidesheets

Precision Agriculture: Yield Monitors (WQ 451)
Casady, W.W., D.L. Pfost, C. Ellis, and D.K. Shannon
http://extension.missouri.edu/explore/envqual/wq0451.htm

Precision Agriculture: Global Positioning System (GPS) (WQ 452)
http://extension.missouri.edu/explore/envqual/wq0452.htm
TODD E. LORENZ

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Boonville, MO 65233
(660) 882-5661

HOME ADDRESS
207 Barnes St.
Pilot Grove, MO 65276
(660) 834-6969

LICENSE OR CERTIFICATES
Missouri Department of Agriculture, Plant industries division,
Missouri Certified Public Operators, Category 1A License: P3450 1992-2003
Missouri Commercial Drivers License
Missouri Department of Health: Registered Installer

EDUCATION


B.S. May, 1986. Central Missouri State University, Warrensburg, MO 64093.
Major: Agriculture Business. Awarded the CMSU Agriculture Sophomore of the Year. Major Professor: Dr. Harold Van Cleaves.

WORK EXPERIENCE:

July 2000- University of Missouri Extension, Boonville, MO 65233
Present Regional Horticulture/Agronomy Specialist-Providing equal program leadership in the fields of horticulture and agronomy in the Central Missouri 14 county region. Responsibilities include needs assessment, facilitation of educational programs, teaching, problem solving, assessing horticulture and agronomy related subject matter for clientele and developing university, community, agency, business and extension council linkages. Provide educational leadership in the development of programs and dissemination of research-based information related to agronomy and horticulture for producers, agribusiness, homeowners and the general public. As the Regional Horticulture Specialist, I am responsible for program development and leadership of the Central Missouri Master Gardener Program. I am responsible for coordination of core training modules, advanced education, meetings, field days, and conferences. I have modified the original Master Gardener program for
correctional facilities to provide an opportunity for inmates to participate and volunteer hours back to the community, now titled Master Gardeners In Corrections (MaGIC). Our intent is to provide them the necessary education, skills and abilities to seek and keep job in the field of horticulture upon release. I am responsible for identifying and developing positive relationships with agricultural leaders and assist in informing agribusiness and producers of program activities and current updates. In partnership with the University, I also serve on the Cooper County Soil and Water District board. I make all programs available to all audiences and promote the total mission of University of Missouri Extension using mass media, direct teaching methods, short courses, producer meetings, Internet capabilities, and individual consultations.

Nov. 1991- Soil Science Dept., University of Missouri, Columbia, MO 65211.
July 2000 Senior Research Specialist-Conducted soil fertility and forage fertility research for the Missouri Agriculture Experiment Station. While primarily responsible for the management of historical Sanborn Field and the F.L. Duley-M.F. Miller Soil Erosion Plots, I was also responsible for forage research on native warm season grasses on farmer cooperative sites and both the Wurdack and Bradford Agronomy Research Centers. My duties included: establishment of research in cooperation with private land owners and farmers, site selection, experimental design and layout, independent field research, hiring and supervision of field staff and students, land preparation, equipment maintenance for both modern farm and research plot equipment, pest control, harvesting, soil and plant sample data management from collection to analysis and from electronic input to statistical analyses, annual report and grant proposal writing, maintaining web site, conducting tours for people with varied background in agriculture, participation in field days and outreach activities. My responsibilities included work with the National Onsite Demonstration Project at Rock Bridge State Park. Coordination of soils and engineering research activities including monitoring of treatment fields where innovative onsite wastewater treatment and modern dispersal technologies were used. I was involved with the Field day activities in coordination with the Show-Me Clean Streams and the Bonne Femme Watershed Partnership that allowed demonstration of the Missouri Wastewater Small Flows Research and Training Center. Additionally, active with the development of a Soil and Water Conservation Clinic and Tour cosponsored by Mo-Ag industries Council and the University of Missouri to provide Certified Crop Advisors continuing education units in soil and water management.
PROFESSIONAL MEMBERSHIP AND COMMUNITY ACTIVITIES

National Association of County Agriculture Agents
  North Central Region Vice Chair
Missouri Association of Agricultural Extension Professionals
  President
University of Missouri Extension Association
Fertilizer Agriculture Lime Advisory Council
University of Missouri Extension Agri-Business Counselor
Central Missouri Agriculture Category Chair
Central Missouri Regional Technology Committee
University of Missouri Farms and Centers Advisory Council
Pilot Grove C-4 School Board
Cooper County Soil and Water District; Moniteau and Cooper
Cooper County Local Emergency Planning Committee
Boonville Area Chamber of Commerce
Knight of Columbus, Cleer Creek Council 2261

AWARDS AND PROFESSIONAL ACCOMPLISHMENTS

CMSU Agriculture Sophomore of the year, 1984
University Outreach and Extension Gold Medal Award, 2001-2002
University of Missouri Extension Association, UMEA Rookie of the year, 2002
Community Development Academy, 2002
University of Missouri Programming Excellence Award 2003
Public Issues Leadership Development Conference, 2004
National Association of County Agricultural Agents, North Central Region Communication
  Award: Computer Generated Program, 2004; Regional Finalist, Slide Set, 2005
Missouri Extension Leadership Development, 2004-05
Missouri Agricultural Extension Professional State Achievement Award 2004
National Association of County Ag Agents National Achievement Award, 2005
National Association of County Agricultural Agents National Recognition and Awards Vice
  Chair, 2002-2006; Chair 2007-2008
Missouri Extension Leadership Development, 2004-2005
Chamber of Commerce Service to Agriculture, 2007
**Wendy R. Flatt, MS, P.A.S.**

4505 Nathaniel Drive Columbia, MO 65202: 573-999-2348
e-mail: wendyflatt@hotmail.com or flattw@missouri.edu

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**Education**

December 2001 Master’s of Science in Animal Sciences, Colorado State University. Fort Collins, Colorado.

Title of Thesis: **Effects of salt and phosphorus supplementation on growth performance, cost of gain, carcass characteristics and digestibility of finishing feedlot cattle.**

May 1993 Bachelor of Science in Animal Sciences, University of Missouri- Columbia. Columbia, Missouri.

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**Work Experience (1989-present)**

**March ‘03-present** Regional Livestock Specialist/County Program Director- University of Missouri Extension, Mark Stewart, Interim Regional Director. David Baker, College of Agriculture, Food and Natural Resources, Program Leader.

- Represent University of Missouri Extension to beef and livestock producers throughout four-county area, Central Missouri and the state of Missouri.
- Provide technical expertise and educational programs for livestock producers.
- Balance rations for various stages and genetics of beef and dairy cattle.
- Created and developed several presentations on various livestock and forage related topics such as: mineral requirements, pasture management, hay quality, using by-products, along with several other presentations.
- Provide extension support for the “Show-Me-Select” heifer program, a statewide replacement heifer development program and the Mid-MO Premier Beef Program (MMPBM), a beef marketing alliance of cow/calf producers in Central-MO area.
- Help producers understand carcass information and how to use the information for decisions on their cow-herds and bull-selections.
- Performance test and grade heifers and bulls for seed-stock breeders.
- Work with local veterinarians on applicable programs.
- Co- or primary author for three grants totaling $90,000 in last three years.
- Editorial board of *Ag Connection* newsletter, a publication reaching producers within 14-county area Central Missouri.
- County Program Director: Administrative duties including; working with county commissioners’ county extension council, community leaders, etc.
- Supervise locally hired staff, including office manager.
- Support and implement Quality System Assessment (QSA), the Missouri Department of Agriculture’s independent source and age identification program for cattle producers in the state of Missouri.
- Write news articles, press releases and present up to date livestock information via newsprint, face to face, interactive television and over the radio, educational displays.
➢ Work one-on-one with beef and dairy producers to provide them with a non-biased source of livestock assistance for their operations, which includes; nutrition, reproduction and genetic assistance.
➢ Collaborated with extension colleagues on a fertilizer and forage study in central MO.

Work Experience (continued)

Sept. ’09–April ’11 United States Department of Agriculture (USDA)- Foreign Agriculture Service (FAS) Agriculture Advisor- USDA-FAS. Kirkuk, Iraq. Burdin Hickok, Economic Section/Agriculture Leader, Department of State. Jim Vancura, Sr. Agriculture Advisor, USDA-FAS.
➢ Develop and implement USDA-FAS programs in Kirkuk, Iraq to Iraqi livestock producers, veterinarians, GOI (Government of Iraq) officials, US and Iraqi private industry officials, USG (US Government) officials, United Nations and Embassy Agriculture officials, Iraqi Professors, etc.
➢ Developing dairy industry through Iraqi farmer associations. Cooperation between Iraqis, US Military, USG Economics and Agriculture section to bring in four “micro-dairy” processors (turn raw milk into yoghurt, cheese and pasteurized milk products) to stimulate the dairy industry in Kirkuk province.
➢ Helped with feedlot and back-grounding program in Kirkuk through USAID-INMA implemented projects. This program helps develop local calves (normally in bad health and condition), produce a safe, local red meat supply for the Iraqi market.
➢ Developed AI program for women and men private veterinarians.
➢ Developed a feral hog program for the Iraqis to use after the American presence has decreased. Feral hogs are a large problem in rural Kirkuk as they destroy crops, spread diseases (to livestock and people), ruin hoop houses, irrigation systems, etc.
➢ Working with Director General of Extension to help extension programs in Kirkuk by giving them extension materials from US and improving existing equipment at their extension farms.
➢ Working with Director General of Livestock on ID system for livestock in Kirkuk, along with getting silage equipment (which is a new technology for them) into country for their research experimental farm.
➢ Supervision of local Iraqi employees and staff (local nationals).
➢ Working with Director General of the State Veterinary Company on several issues, including vaccination programs, AI equipment, nutrition programs for livestock, feral hog program and Crimean-Congo Hemorrhagic Fever.
➢ Applied for and received $3,542,000 of grants from CERP (Commanders Emergency Response Program), QRF (Quick Release Funds) and TDP (Targeted Development Program) funds to purchase equipment and do training for the Iraqis. These funds purchased;
  o Four micro-dairy processors worth a total of $2 million.
  o Dairy training for 52 men and women farmers, 16 technicians and engineers that will work inside the processors once running.
  o One silage cutter and wagon, which is very new technology to Iraq.
  o Two hoop-house heaters and a two-wheeled tractor with sickle bar to cut forage at the extension farm (they were doing it by hand, previously).
Artificial insemination and estrous synchronization training and equipment for 57 Iraqi men and women private veterinarians, who were part of the Kirkuk Veterinary Syndicate.

Ten no-till drills (and training), which went to the agriculture district offices for farmers to learn to use and the University of Kirkuk (UK).

Fourteen-4 and four-6 row planters (and training) to several of the agriculture district offices for farmers to learn to use and (UK).

Two women’s entrepreneur programs impacting approximately 50 Iraqi women, to help them develop businesses throughout Kirkuk province.

Publications


Joni Harper  
100 E. Newton St. 4th Floor  
Versailles, MO 65084  
(578) 378-5358  
rossjo@missouri.edu

**Education**  
M.S., Crop, Soil & Environmental Science, December 2004 (University of Arkansas, Fayetteville, AR)  
B.S.A., Crop Management, May 2002 (University of Arkansas, Fayetteville, AR)

**Experience**  
Regional Agronomy Specialist: (March 2007-present)  
University of Missouri Extension, Versailles, MO. I am the Regional Agronomy Specialist for Morgan, Moniteau, Benton, and Pettis Counties.

Class Instructor: (August 2005-May 2006)  
Western Illinois University, Macomb, IL. Taught a Jr./Sr. level undergraduate course that focused on developing the student’s skills in public speaking and scientific writing.

Graduate Research and Teaching Assistant: (May 2002-Dec. 2004)  
University of Arkansas, Fayetteville, AR. Conducted field research experiments for major advisor, as well as conducting M.S. research. Performed several soil testing procedures in the Soil Testing Laboratory. Taught Introduction of Soil Science Laboratory class.

Gypsy Moth Trapper: (May-August 2000 and 2001)  
USDA-APHIS, headquartered in Chicago, IL. Worked two summers for the USDA-APHIS department in the trapping, tracking, and eradication of the destructive gypsy moth. The job entailed a basic knowledge of the gypsy moth, mapping reading, and the ability to write clear and concise reports.

Laboratory Technician: (Aug. 1998 to May 2001)  
University of Arkansas, Fayetteville. Worked in the Soil Characterization Laboratory for three years. Was in charge of performing various soil procedures such as: carbon analysis, particle size, extractable acidity, soil moisture and sand content. A knowledge of field work, such as running a soil probe, taking soil water table measurements, and writing soil descriptions, was acquired in this job.

**Memberships**  
Missouri Association of Agricultural Extension Professionals  
University of Missouri Extension Association  
National Association County Agricultural Agents
North Central Agronomy & Pest Management Vice-Chair
Morgan and Moniteau Soil and Water Conservation Districts Board Supervisor
Soil Science Society of America
American Society of Agronomy
Crop Science Society of America
University of Arkansas Crop, Soil, and Environmental Science Club
Alpha Zeta: University of Arkansas Fraternity/Sorority of Alpha Zeta

Publications


Moldenhauer (eds.) B.R. Wells Rice Research Studies 2003. University of
Arkansas Agricultural Experiment Station Research Series 517: 303-311.
Fayetteville, Ark.

to Soil and Foliar Boron Applications. In: N.A. Slaton (ed.) Wayne E. Sabbe Soil
Fertility Studies 2002. University of Arkansas Agricultural Experiment Station

N.A. Slaton, P.K. Bollich, D. Dunn, J.R. Ross, M. Mozaffari, and L. Espinoza.
2002. Rice Response to Boron Application Rate and Time in Arkansas,
Rice Research Studies 2002. University of Arkansas Agricultural Experiment

**Presentations**

and soybean response to boron fertilizer in Arkansas. Oral paper given at the Ark.
Crop Protection Association Conf. on 5 Dec. 2002, Fayetteville, AR.

response to boron fertilization in Arkansas. Poster paper given at the Southern
Branch ASA Annual Meeting on 2-4 Feb. 2003, Mobile, AL.

Soybean response to boron fertilization in Arkansas. Oral paper given at the Ark.
Crop Protection Association Conf. on 1 Dec. 2003, Fayetteville, AR.

boron fertilization in Arkansas. Oral paper given at the Rice Technical Working
Group Conf. on Feb. 2004, New Orleans, LA.

Soybean response to boron fertilization in Arkansas. Oral paper given at the
Robert L. Kallenbach

Professor and State Extension Specialist
Division of Plant Sciences – 108 Waters Hall
University of Missouri
Columbia, MO 65211

Phone (573) 884-2213
Fax (573) 882-1467
e-mail: kallenbachr@missouri.edu

Education:
Ph.D., Agronomy, with an emphasis in statistics. 1994. Texas Tech University, Lubbock TX.
B.S., Agronomy. 1989. Southwest Missouri State University, Springfield, MO.

Professional Employment and Experience (Since 1994):

Professional Service, Honors and Awards (Since 2004):
2011: C. Brice Ratchford Fellow. (Fellowship given to one person in the MU-system annually)
2010: Missouri Grasslander - Agency. (Statewide award given by the Missouri Forage and Grassland Council to one agency person each year)
2009: University of Missouri "Teamwork Extension Award". (System wide award given to a group of faculty and regional specialists working together on innovative outreach programming.)
2007: Donald W. Fancher Provost Award for Outstanding Achievement in Extension and Continuing Education. (Campus-wide award given to one faculty member at the University of Missouri each year.)
2004: Young Crop Scientist award presented by the Crop Science Society of America (International award given to one scientist under 37 years of age annually)
2004: J.W. Burch State Specialist Award for Outstanding Statewide Program Leadership
2004: Gamma Sigma Delta Honor Society award for Excellence in Extension Education

Membership in Professional Societies:
American Society of Agronomy, 1990 to present
Crop Science Society of America, 1990 to present
American Forage and Grassland Council, 1990 to present
Missouri Forage and Grassland Council, 1998 to present
Gamma Sigma Delta Honor Society of Agriculture, initiated in 1988

Research Activities:
Refereed Journal Articles 52
Book Chapters 2
Proceedings and Abstracts 121
Grants Dollars Awarded $6,837,267

Extension Education:
Extension Manuals and Guides 34
Workshops and Short Courses taught 118
Extension education meetings and classes taught 302
Selected publications

Refereed Journal Articles (Since 2007):


Book Chapters:


Brent D. Carpenter

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Education
M.S. Agricultural Economics, Texas Tech University, Lubbock, 1989.
B.S. Animal Science, Abilene Christian University, Abilene, Texas, 1983.

Positions
Associate Extension Professional and Agricultural Business Specialist for Central Missouri Region, University of Missouri Extension, Sedalia. Oct 2011 to present.

   Performed applied economic research and coordinated FAPRI educational outreach activities. Research focused on the financial implications of federal agricultural policies at the farm level. Roles entailed frequent briefings with farmers, academics, industry leaders, and Congressional staff.

Farm Management Specialist for South-Central Region and Gasconade County Program Director, University of Missouri Extension, Owensville. Oct 1991 to Feb 2001.
   Successfully developed a comprehensive educational program in applied economics with specific interests in farm business management and public policy issues. Administered local office and programs. Built strong partnerships with diverse community organizations.

   Led the 4-H youth program and served as a technical advisor for agricultural production issues in county with the fastest population growth in Texas and $70 million agricultural sales.

   Conducted applied economic research leading to thesis and publication in two refereed journals.

   Inside sales of animal health supplies and livestock equipment.

Awards
- National Team Award for Excellence in Farm Financial Management Education, National Association of County Agricultural Agents, 2005
- Outstanding Agriculturalist, Missouri Farm Bureau, 2000.
- Achievement Award, National Association of County Agricultural Agents, 1999.
- Extension Teamwork Award, University Outreach and Extension, 1997.
- Young Professional Award, Department of Agricultural and Environmental Sciences, Abilene Christian University, 1994.
International Experience
- South Africa. Three-week study tour of agricultural industries, June 2005.

Recent Outreach Publications (sample)
- *Farm-level Economic Analysis of Wildlife Habitat Buffers in Missouri*, 2008.
- *Missouri Crop and Forage Costs of Production*, with M. Brees, Published annually 2005-present.

Software Developed for Public Use (sample)
- *Crop Budget and Forage Budget Generators*. Estimates costs and returns for major crop and forage enterprises in Missouri, released with S. Gerlt in 2005, updated annually.
- *Cow Replacement Calculator*. A net present value model to evaluate the decision to purchase a beef breeding female, released in 2004, updated annually.

Recent Presentations (sample)
- Hearings (3) of the MO House Interim Committee on Emerging Issues in Agriculture, 2008.

FAPRI Conferences Organized (sample)
- Missouri Agriculture Outlook Conferences, Jefferson City, 2009 and 2010.
- Breimyer Seminar: Unpacking the 2008 Farm Bill, MU Campus, 2008.
- Representative Farm Conference, MU Campus, 2003.
- Coordinated and/or presented at 40 to 80 meetings per year with Missouri farm audiences, 2001-2010.

Professional and Honorary Organizations
- National Association of County Agricultural Agents since 1989.
- Gamma Sigma Delta and Delta Tau Alpha National Agricultural Honorary Societies.

Volunteer Service
- Treasurer and Assistant Scoutmaster for large Boy Scout troop, 2005-present.