



Newsletter from the Department of Animal Sciences and Industry
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UPCOMING EVENTS...

➤ **Plan to attend the 38th Annual Midwest Meat Processing Workshop on March 27 at K-State.** Join us at the workshop and meet Travis O'Quinn who joined KSU this past summer as a Meat Extension Specialist. Dr. O'Quinn will discuss palatability attributes of grass-finished and enhanced beef. This is a great opportunity to see, hear and ask questions as state award winners share their expertise and demonstrate the manufacture and techniques used to make award winning products. Brock Volkmann, Richards Cold Storage, will demonstrate making his award winning ground and formed beef jerky, and Danny Williamson and Gustavo Gloria, Krehbiels Specialty Meats, will demonstrate production of their award winning fresh specialty bratwurst. Dr. Fadi Aramouni will provide strategies for determining sampling frequency for meat plant operations. Brandon Goering, PhD Candidate at KSU will discuss the influence of belly quality on bacon. Dr. Joe Baumert, Co-Director, Food Allergy and Research and Resource Program, University of Nebraska will talk about allergens, labeling, and control for small meat processing businesses. Dr. Dennis Burson from the University of Nebraska will demonstrate antimicrobial interventions for grinding, as well as their impact on ground beef color and shelf life stability. A discussion will also be held on requirements for recall plans. Contact Liz Boyle at lboyle@ksu.edu or 785-532-1247 for more information.

➤ Make plans now to attend the **2015 Kansas Junior Meat Goat Producer Day planned for March.** Kansas Junior Meat Goat Producer Day will be held on Saturday March 28, 2015 at Kansas State University's Weber Hall in Manhattan, KS. This hands-on educational event will be a fun filled day of activities in which youth, parents, meat goat project leaders and adults can increase their knowledge and experience of meat goat production and management practices. All participants will receive a T-shirt complimentary lunch, and educational materials. The schedule is as follows:

8:45 a.m.	Registration – Weber Lobby
9:15 a.m.	Welcome and Opening Remarks
9:30 a.m.	Market/Breeding Goat Selection
10:30 a.m.	Break
10:45 a.m.	Facilities
11:15 a.m.	Skillathon
12:00 noon	Lunch
12:45 p.m.	Health & Wellness
1:30 p.m.	Market/Breeding Goat Nutrition
2:15 p.m.	Break
2:30 p.m.	Market/Breeding Fitting & Showing
4:00 p.m.	Closing

Pre-registration is \$15.00 by March 18, 2015. Registrations after March 18 and at the door are \$20/participant. For a registration form and more information, visit www.asi.k-state.edu/species/sheep-and-goats/educational-programs.html For more information, contact Brian Faris (brfaris@ksu.edu; 785-532-1255).

March, 2015

News from KSU Animal Sciences

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We Need Your Help!

Please send questions, comments or ideas for future newsletter topics to lschrein@ksu.edu or call (785) 532-1267.



↪ **Kansas State University will be hosting a series of Barbecue 101 workshops this May and June.** Barbecue 101 is a one day workshop focusing on teaching the basics of grilling and smoking to consumers of all ages and experience levels. The topic areas will provide a unique perspective on the science of barbecuing as well as give insight to selecting meat, wood, rubs, spices and sauces to use at your next barbecue. Dates and locations for the workshops include: May 2 – K-State Olathe Campus; May 9, KSU Stanley Stout Center, Manhattan; May 30 – Hays; and June 6 – Winfield. The schedule includes:

8:00 Welcome	12:30-3:00 Afternoon Station Rotations
8:15 Meat Cutting Basics	Selecting the Right Smoker for You
9:15 All About Rubs & Spices	BBQ Regionality: A Difference in Sauce
9:45 Break	Meat Cuts to Stretch the BBQ Dollar
10:00 BBQ Food Safety	Taste the Difference: It's All in the Wood
10:30 Science of Smoking	Meat Preparation & Selection
11:30 Lunch	3:30 Competition BBQ Expert Roundtable
	4:00 Closing & Evaluations

Registration is \$50 for an individual or \$80 for a couple. Registration closes one week prior to each scheduled event. Registration fee includes lunch, apron and Barbecue 101 Course Book containing cooking guides, recipes and barbecue tips and tricks. Space is limited at each location. For a registration form and more information, visit www.asi.k-state.edu/barbecue101workshop.html. For more information, contact Travis O'Quinn (travisquinn@ksu.edu; 785-532-3469).

↪ The **KSU Youth Horse Judging Camp – Beginners Section** will be held June 2, 2015 and the **KSU Youth Horse Judging Camp – Advanced Section** will be held June 3-4, 2015. Both camps will be held in Weber Arena on the KSU Campus. Registration for both camps must be paid by May 10, 2015. Camp will be limited to the first 30 participants. For more information, camp agenda and registration forms, visit the website www.asi.ksu.edu/p.aspx?tabid=1141. You can also contact James Lattimer, (785-532-2840; jlattimer@ksu.edu) or Tasha Dove at (tashakd@ksu.edu).

↪ Make plans now to attend the **Developing and Implementing Your Company's HACCP Plan** for meat, poultry, and food processors. One session will be held June 2-4, 2015 in Weber Hall, Kansas State University, Manhattan and another session October 7-9, 2015 in Olathe, KS. Watch for more details. For more information, contact Dr. Liz Boyle at lboyle@ksu.edu or 785-532-1247.

↪ **K-State Animal Sciences Leadership Academy Planned for June.** Kansas State University will host the 7th Annual K-State Animal Sciences Leadership Academy for young livestock industry leaders in Kansas. This year two sessions will be offered: June 10-13 or June 17-20, 2015. This intensive four day educational experience will focus on increasing the participant's knowledge of a dynamic and sustainable livestock industry and its importance to a global food system. Only 20 students will be accepted for each session to ensure individualized attention from counselors, professors and industry leaders. Participants will stay on campus in university housing with program staff for the duration of the event. Transportation to and from the event is the responsibility of the participant, along with a \$50 deposit to reserve his or her space. The Livestock and Meat Industry Council generously provides all other sponsorships.

Students must apply by April 1, 2015. Candidates have to be enrolled in high school and able to participate in the entire academy. More information, including registration forms, is available at <http://bit.ly/KSUASILeadershipAcademy>. Please contact academy director Sharon Breiner with questions at sbreiner@ksu.edu or 785-532-6533.

CALENDAR OF UPCOMING EVENTS

Date	Event	Location
March 27, 2015	Midwest Processed/Cured Meat Workshop	Manhattan
March 28, 2015	Kansas Junior Meat Goat Producer Day	Manhattan
May 2, 2015	Barbecue 101 Workshop	Olathe
May 9, 2015	Barbecue 101 Workshop	Manhattan
May 30, 2015	Barbecue 101 Workshop	Hays
June 2, 2015	KSU Youth Horse Judging Camp – Beginners Section	Manhattan
June 2-4, 2015	Developing and Implementing Your Company's HACCP Plan	Manhattan
June 3-4, 2015	KSU Youth Horse Judging Camp – Advanced Section	Manhattan
June 6, 2015	Barbecue 101 Workshop	Winfield
June 10-13, 2015	Animal Sciences Leadership Academy	Manhattan
June 17-20, 2015	Animal Sciences Leadership Academy	Manhattan

WHAT'S NEW.....

Management Minute "People Quit People Too"



Management Minute – Chris Reinhardt, Ph.D., Extension Feedlot Specialist **"People Quit People Too"**

People quit for any number of reasons. It's important for the astute manager to find out why.

One axiom that has been often quoted is that if an employee asks for more money, even though you know the employee's pay is competitive, it's not really about the money; the employee is dissatisfied with some condition or multiple conditions about the workplace--or you. The employee is essentially screaming, "I hate my job, but for more money I'll gut it out a little while longer!" However, most times even if they do stay, if the root cause of the dissatisfaction is not addressed, the employee will leave sooner than later.

The reason managers need to keep a very tight handle on the root causes of personnel turnover is that turnover costs money in the form of lost productivity, overtime for other employees, the hiring and training process, and the lost productivity of those workplace leaders who must take out time to train the new hire.

Ask around to find out if other employers are having similar turnover challenges. If not, it's time to look in the mirror. If your compensation is competitive but you're still losing good employees, there is something wrong. There is a likelihood that your workplace is not conducive to employee satisfaction.

The workplace culture is initiated, nurtured, and cultivated by the team leader. It's time to ask a trusted advisor for help; this is often referred to as "The Hot Seat". Many (maybe even most) managers are simply not ready to hear and accept constructive criticism. Humility in the workplace is priceless and often in short supply. The good news is that if the problem in the workplace turns out to be YOU, then at least you know you can do something about the problem.

Be ready to really hear, internalize, and take decisive action in response to whatever difficult advice you may receive. Either be prepared to make substantial changes, or simply keep losing good team members to your neighbors and competitors. It's hard, but it's also that simple.

For more information, contact Chris at 785-532-1672 or cdr3@ksu.edu.



Feedlot Facts – Chris Reinhardt, Ph.D., Extension Feedlot Specialist **"Mud Season....Again"**

Consider the humble Box Blade.

As a feedlot nutritionist, you'd think my favorite piece of equipment or technology would be the steam-flaker, the feed mixer, the small-ingredient inclusion system. No. I love the box blade.

Why? Because the nutritionist owns performance. BRD belongs to someone else, but when closeouts are chronically below expectations, the nutritionist often takes the heat.

As we come into Spring, lots can become muddy, and mud has devastating impacts on performance.

Cattle need a (relatively) dry comfortable place to lie down. If winter moisture has resulted in destruction of the mound, it's time to run the box blade. Cattle that cannot rest do not perform.

Cattle should have 20-25 square feet of mound area on which to lie down. The top surface (5-10 feet wide) of the mound should be crowned side-to-side, and longitudinally have a mild grade similar to the direction of the slope of the pen, which is normally between 1 and 6%. The sides of the mound should have a slope of 1:5 to enhance drainage yet still allow cattle to lie on the surface.

The end of the mound should connect directly to the concrete bunk pad so that, especially during muddy conditions, cattle can move freely and easily between the mound and the bunk and water areas. This will encourage both feed consumption and resting behavior, both of which will enhance performance during inclement weather.

For more information, contact Chris at 785-532-1672 or cdr3@ksu.edu.

Feedlot Facts "Mud Season....Again"

↪ The Department of Animal Sciences and Industry, Kansas State University seeks applicants for our **Extension Assistant, Youth Livestock Coordinator position**. This is a full-time, 12-month, term position. A Bachelor of Science degree in Animal Sciences or related discipline is required by date of hire. View complete position announcement at: www.asi.ksu.edu/about/job-announcements.html. For additional information, contact Dr. Mike Tokach, Search Committee Chair: mtokach@ksu.edu. Review of applications begins March 27, 2015 and continues until the position is filled.

↪ **Electrostatic Spray Cabinet Evaluation to Verify Uniform Delivery of Chemical and Biological Solutions to Pre-Chilled Meat Animal Carcasses** – The objectives of this study were to calibrate an electrostatic spray (ESS) cabinet, test the chemical deposition profile of the cabinet onto a meat carcass using fluorescent dye, and determine if the ESS cabinet could uniformly apply a biological inoculum to a carcass. Calibration of the cabinet was accomplished by testing and adjusting air pressure and fluid flow. A fluorescent dye test was conducted by spraying ~6.8 ounces of a dye solution onto a carcass side. A black light was used to observe dye deposition. An inoculation study used 6.3 quarts of non-pathogenic *E. coli* culture inoculum. Approximately 6.8 ounces of this inoculum was sprayed onto a pig carcass side. The carcass was sampled after a 30-minute microbial attachment period at eight anatomic locations.

The fluorescent dye was shown to cover all carcass surfaces in a highly uniform manner. The inoculation test showed a uniform recovery of ~5–6 log cfu/ cm² (100,000 to 1 million bacteria) across all anatomic regions, except a slightly lower inoculum level at the top hock area.

Bottom Line...ESS technology could reduce the volume of chemical antimicrobial sprays required in commercial carcass decontamination and could be used to inoculate a carcass uniformly to support future carcass intervention studies. View the complete research report at www.asi.ksu.edu/cattlemensday. For more information, contact Randall Phebus (785-532-1215; phebus@ksu.edu) or Elizabeth Boyle (785-532-1247; lboyle@ksu.edu).

↪ **Evaluating the Effectiveness of Transport Media on Shiga Toxin-Producing *E. coli* Serotypes** - Three different culture media types including buffered peptone water, Cary-Blair transport media, and maximum recovery diluent were inoculated with seven strains of STEC and placed in refrigerators at either 39°F or 50°F to simulate possible conditions during sample shipment from the field to an analytical laboratory. The media were sampled at 0, 12, 24, 48, and 72 hours and the results compared. The objective was to evaluate the ability of three common culture media types used to transport field-based samples for laboratory determination of Shiga toxin-producing *E. coli* (STEC) levels and viability. The goal was to identify which transport medium maintained STEC levels at or near original inoculation levels.

Although the media types showed little variation at 39°F, at 50°F the Cary- Blair transport media demonstrated the best ability to maintain the STEC population at original inoculation levels.

Bottom Line...Using Cary-Blair transport media with proper refrigeration temperatures will enable gathering and shipping of environmental and beef samples to analytical laboratories with reduced likelihood of STEC level fluctuations and allow quantitative STEC measurements to be made to support research and regulatory programs in the meat industry. View the complete research report at www.asi.ksu.edu/cattlemensday. For more information, contact Randall Phebus (785-532-1215; phebus@ksu.edu) or Elizabeth Boyle (785-532-1247; lboyle@ksu.edu).

↪ **Comparison of Soybean Oil and Different Sources of Corn Oil on Nursery Pig Growth Performance-**

A total of 350 pigs (PIC 1050; initially 26.45 ± 0.09 lb and 45 d of age) were used in a 21-d study to compare the effects of soy oil and 2 sources of corn oil on nursery pig growth performance. The 7 dietary treatments consisted of a corn-soybean meal–based control diet with no added oil or the control diet with 2.5 or 5% soybean oil (NE = 3,422 kcal/lb) or corn oil from 2 different sources (NE = 3,383 kcal/kg for both sources). There were 5 pigs per pen and 10 pens per treatment. Pig weight and feed disappearance were measured on day 0, 7, 14, and 21 of the trial to determine ADG, ADFI, and F/G.

Overall (d 0 to 21), increasing corn or soybean oil improved ADG, F/G, and final (d-21) BW, but a source x level interaction was observed for ADG, F/G, and caloric efficiency (CE; caloric intake/total BW gain). For ADG, increasing soy oil or corn oil source 1 from 2.5 to 5% increased ADG, whereas increasing corn oil source 2 from 2.5 to 5% decreased ADG. Feed efficiency also improved at a greater rate for pigs fed increasing corn oil source 1 compared with the other oil sources. Caloric efficiency was not influenced by soy oil or corn oil source 2 but was improved as corn oil source 1 increased in the diet. The improved CE for corn oil source 1 indicated that the energy value of this source was underestimated.

Bottom Line... In conclusion, soybean or corn oil improved ADG and F/G as expected; however, growth performance varied among the 3 oil sources. This study shows the benefits of adding an oil source

in late-phase nursery pig diets to achieve improved ADG, F/G, and CE, but more research is needed to determine the cause of the varied responses between corn oil sources. More information is available on this experiment and others in the KSU Swine Day Report at www.KSUswine.org. (This study conducted by K.E. Jordan, M.A.D. Goncalves, J.E. Nemechek, J.A De Jong, M.D. Tokach, R.D. Goodband, S.S. Dritz, J.M. DeRouchey, and J.C. Woodworth)

↪ **Effects of an Algae-Modified Montmorillonite Clay on Growth Performance of Nursery Pigs Fed Diets Contaminated with Low Levels of Deoxynivalenol-** A total of 360 barrows (PIC 1050; initially 25.1 lb and 45 d of age) were used in a 21-d growth trial to evaluate the effects of an algae-modified montmorillonite clay (AMMC) on nursery pig performance when fed diets contaminated with low levels of deoxynivalenol (DON). Pigs were allotted to pens by weight, and pens were randomly assigned to 1 of 9 dietary treatments arranged in a 3 × 3 factorial with main effects of DON (0, 1.5 ppm, or 3.0 ppm) and AMMC inclusion (0, 0.17%, or 0.50%). There were 5 pigs per pen and 8 pens per treatment. Mycotoxin analyses were conducted on the main ingredients at NDSU3 and LDA Labs4, and the results were used in diet formulation. Naturally contaminated wheat (6.03 ppm DON) was used to produce diets with desired DON levels. No significant DON × AMMC interactions were observed during the entire study. Overall (d 0 to 21), increasing DON concentration in the diet decreased (1.22 vs. 1.10 vs. 1.07 lb) ADG and d-21 BW as a result of decreased ADFI (2.13 vs. 2.05 vs. 2.11 lb) and poorer feed efficiency (1.49 vs. 1.50 vs. 1.64). As expected, DON-related growth reductions were most marked from d 0 to 7 (15 to 22% lower) and least distinct in the final period, d 14 to 21 (5 to 6% lower). Incorporating AMMC at increasing levels had no effect on ADG, ADFI, feed efficiency, or final BW.

Bottom Line... Overall, the results of this study reinforce prior research showing that even low levels of DON significantly reduce nursery pig growth, but the addition of AMMC does not offset the deleterious effects of DON. More information is available on this experiment and others in the KSU Swine Day Report at www.KSUswine.org. (This study conducted by S.Q. Fowler, H.L. Frobose, M.D. Tokach, J.M. DeRouchey, S.S. Dritz, R.D. Goodband, and J.L. Nelssen)

↪ **Validating a Dietary Approach to Determine Amino Acid:Lysine Ratios for Pigs-** Standardized ileal digestible (SID) amino acid:lysine (AA:Lys) ratio experiments are commonly conducted to estimate the AA requirement of pigs relative to lysine (Lys) and allow for accurate diet formulation. The objective of the studies herein was to validate a dietary approach to determine the optimal SID AA:Lys ratio for pigs using tryptophan (Trp) as a model. Four 21-d experiments were conducted in which pigs (337 × 1050; PIC) were fed corn-soybean meal-based diets with 30% corn dried distillers grains with solubles (DDGS). A total of 1,188, 1,232, 1,204, and 1,183 pigs with initial BW of 28.5 ± 0.4, 50.1 ± 1.3, 127.0 ± 2.5, and 192.5 ± 2.6 lb were used in experiments 1, 2, 3, and 4, respectively. Each experiment had 11 pens per treatment with 24 to 28 pigs per pen. In Experiment 1, each pen housed the same number of barrows and gilts, whereas in Experiments 2 to 4 only gilts were used. Dietary treatments were: (1) High CP, High Lys, and High Trp:Lys ratio (HHH); (2) Low CP, High Lys, and High Trp:Lys ratio (LHH); (3) Low CP, Low Lys, and High Trp:Lys ratio (LLH); and (4) Low CP, Low Lys, and Low Trp:Lys ratio (LLL). The SID Trp concentrations used were 14.5 vs. 20% of Lys, CP was at least 3 percentage units different, and SID Lys levels were 0.01 percentage unit above the estimated requirement at the expected initial BW and 0.10 or 0.05 percentage units below requirement at the expected final BW of the Experiment 1 (nursery) and Experiments 2, 3, and 4 (finishing), respectively. In Experiment 1, decreasing CP (HHH vs. LHH) did not influence ADG but increased F/G. Decreasing Lys (LHH vs. LLH) and decreasing the SID Trp:Lys ratio (LLH vs. LLL) reduced ADG and increased F/G. In Experiment 2, decreasing CP (HHH vs. LHH) did not affect ADG but increased F/G. Decreasing Lys (LHH vs. LLH) and the SID Trp:Lys ratio (LLH vs. LLL) decreased ADG and increased F/G. In Experiment 3, decreasing CP (HHH vs. LHH) or Lys (LHH vs. LLH) did not influence ADG or F/G. Decreasing the SID Trp:Lys ratio (LLH vs. LLL) reduced ADG and increased F/G. In Experiment 4, decreasing CP (HHH vs. LHH) did not influence ADG but increased F/G. Decreasing Lys (LHH vs. LLH) had no effect on performance, but decreasing the SID Trp:Lys ratio (LLH vs. LLL) reduced ADG and increased F/G.

Bottom Line... In conclusion, low-CP diets formulated 0.10 and 0.05 percentage units below the SID Lys requirement at the end of the experiment's weight range appear to ensure pigs are below their Lys requirement when determining the optimal SID Trp:Lys ratio for 29- to 52-lb and 50- to 80-lb pigs, respectively. For pigs heavier than 80 lb, formulating diets at 0.05 percentage units below the SID Lys requirement at the end of the experiment's weight range can limit the ability to provide statistical evidence that pigs are under their lysine requirement. More information is available on this experiment and others in the KSU Swine Day Report at www.KSUswine.org. (This study conducted by M.A.D. Goncalves, M.D. Tokach, S.S. Dritz, K.J. Touchette, J.M. DeRouchey, J.C. Woodworth, and R.D. Goodband)

AS&I Faculty Spotlight



Liz Boyle (lboyle@k-state.edu; 785-532-1247)

Professor/Extension Meats Specialist

Originally from Richfield, Minnesota, Liz Boyle has been a member of the Animal Science faculty since 1992. She received her B.S. (Wildlife Biology) degree from the University of Minnesota in 1980. Her M.S. (Food Science and Nutrition) and Ph.D. (Food Science, Meats emphasis) degrees were received from Colorado State University in 1987 and 1991, respectively. Following post-doctorate work at the University of Kentucky and the University of Minnesota, Dr. Boyle made the move to Kansas.

Dr. Boyle works primarily in Extension (0.7 appointment) to enhance the quality and safety of meat products and to provide scientific and technical assistance to meat processors and trade associations. She also teaches Hazard Analysis and Critical Control Point (HACCP) workshops nationally as a certified Lead HACCP instructor and teaches (0.3 appointment) undergraduate and graduate courses in HACCP and Advanced HACCP.

Her research interests focus on the impact of HACCP on small and very small meat and poultry processing facilities, meat safety and quality.

Dr. Boyle enjoys spending her free time with her husband Dan and her daughter Jessica.



Teresa Douthit (douthit@k-state.edu; 785-532-1268)

Associate Professor/Equine Nutrition

A native of St. Francis, KS, Teresa Douthit was raised on a farm that produced a variety of crops and registered horned Hereford cattle. While in St. Francis, Dr. Douthit showed horses, was active in 4H and FFA, and was a member of several state champion judging teams.

Dr. Douthit then judged livestock at Butler County Community College and later at KSU. She was also on the K-State Horse Judging Team that won the Congress in 1998. She graduated *summa cum laude* from KSU with a degree in animal science in 1999. She then completed an MS under Dr. Randel Raub in equine nutrition. While working on her MS, Teresa was an assistant coach for the KSU horse judging team and helped form the very first KSU equestrian team.

Teresa went to Colorado State in 2001 for a PhD in reproductive physiology. There she coached the horse judging team to two national championships at Arabian Nationals. She worked under Drs. Gordon Niswender and Jason Bruemmer in studying luteal function in mares and ewes.

In 2004, Dr. Douthit returned to K-State to accept a joint appointment with animal science (40%) and the equestrian team (60%). After serving as head coach to the KSU varsity equestrian team and coaching the team to a Reserve National Championship (along with producing several national champion riders), Dr. Douthit changed gears and became a full-time faculty member in the ASI department. In November 2006, she became an Assistant Professor in Equine Nutrition here at K-State. She now teaches Horse Science, Equine Nutrition, and Equine Exercise Physiology. Her current appointment is 70% teaching and 30% research.

Dr. Douthit's research program has looked at the effect of fescue on digital circulation in the horse, and she is currently investigating preventive measures for laminitis. Her research program is also evaluating the glycemic response of horses to a variety of feedstuffs.

What Producers Should Be Thinking About.....

WHAT PRODUCERS SHOULD BE THINKING ABOUT IN MAY.....

BEEF -- *Tips by Dale Blasi, Extension Beef Specialist*



Breeding season is beginning or continuing for many operations; therefore, both females and males must be reproductively fit.

- 1) Several estrus synchronization procedures have been developed. To determine the correct synchronization program to use, consider the following: age group of females (yearling replacement heifers vs. cows), commitment of time and efforts for heat detection, potential number of females that are anestrus (days post partum, body condition, calving difficulty), labor availability, and the return on investment for total commitment to the breeding program.
 - 2) Handle semen properly and use correct AI techniques to maximize fertility.
 - 3) Natural service bull should have body condition, eyes, feet, legs and reproductive parts closely monitored during the breeding season. Resolve any problems immediately.
 - 4) All bulls should have passed a breeding soundness examination prior to turnout.
- Begin your calf preconditioning program. Vaccination, castration and parasite control at a young age will decrease stress at weaning time. This is a time to add value to the calf crop.
 - Implanting calves older than 60 days of age will increase weaning weight.
 - Properly identify all cows and calves. Establish premises numbers for compliance with state and national programs.
 - Use best management practices (BMPs) to establish sustainable grazing systems.
 - Use good management practices when planting annual forage sources and harvesting perennial forages.
 - Maintain records that will verify calving season, health programs, and management practices.

*We need your input! If you have any suggestions or comments on **News from KSU Animal Sciences**, please let us know by e-mail to lschrein@ksu.edu, or phone 785-532-1267.*