

# News from KSU Animal Sciences

## March, 2008



**Newsletter from the Department of Animal Sciences and Industry**  
**213 Weber Hall, Kansas State University, Manhattan, KS 66506**  
**785-532-6131 - [www.asi.ksu.edu](http://www.asi.ksu.edu)**

## WHAT'S NEW...

- ↳ The **2008 KSU Cattlemen's Day** was a huge success with over 1,000 beef producers, allied industry representatives, K-State staff and students registered this year. New this year was the live Agri-Talk broadcast from Weber Arena. You can view video from this broadcast at <http://www.asi.ksu.edu/DesktopDefault.aspx?tabid=1232>. We appreciate your attendance and support of this educational event and would also appreciate any comments or suggestions you might have for next year. In the next few months, we will be including some of the 2008 Beef Research Highlights. For more information on these trials, as well as a video of the presentations, visit [www.ksubeef.org](http://www.ksubeef.org).
- ↳ **Cattlemen's Day posters available** - The written 1 page summaries from the 2008 Cattlemen's Day publication have been enlarged to an approximately 15" x 20" size and mounted on poster board. If you would like to display one or more of these around your office, at a meeting, in the library or at the fair.....please contact Linda Siebold at [lsiebold@ksu.edu](mailto:lsiebold@ksu.edu); 785-532-1281. We are planning to have them on display at the Roundup in Hays on April 17th and they could be checked out from there or make other arrangements as needed. We could also make available the larger (3' x 4') colored posters. This would be an excellent way to show the research going on at K-State.
- ↳ **Length of the Weaning Period Does Not Affect Post-Weaning Growth or Health of Lightweight Summer-Weaned Beef Calves** - Angus cross calves (n = 400) were stratified by age and assigned to one of five weaning periods (60, 45, 30, 15, or 0 days) that corresponded to the length of time between separation from dams and shipping to an auction market. Calves were vaccinated against common diseases 14 days before separation from dams and again on the day of separation. On a common shipping date (day 0; August 24, 2007), calves were transported 3 hours to a commercial auction market and held for 14 hours. Calves were then transported 1 hour to a feedlot. All calves were fed the same diet free choice throughout the trial; they also were monitored twice daily for symptoms of respiratory disease. Body condition of dams was assessed 60 days before and 60 days after shipping.  
*The Bottom Line...* Under the conditions of our study, ranch-of-origin weaning periods of between 15 and 60 days did not improve calf health or growth performance relative to shipping calves immediately after maternal separation. For more information, contact Twig Marston (785-532-5428; [twig@ksu.edu](mailto:twig@ksu.edu)) or KC Olson (785-532-1254; [kcolson@ksu.edu](mailto:kcolson@ksu.edu)).
- ↳ **Optimizing Ground Beef Lean Sources to Maximize Display Color Life** - Cow muscles pre-ranked for color stability as high (*M. longissimus thoracis*), intermediate (*M. semimembranosus*), or low (*M. triceps brachii*) were used in six ground beef formulations. Also, inside rounds from beef cows and dairy cows were combined to make three beef/dairy blends. These blends were formulated to 80% and 90% lean points using fat from either beef or cow trim. Two 0.25-lb patties were made for each blend and evaluated for visual and instrumental color.  
*The Bottom Line.....* Use of high color stability muscles can be optimally managed to lengthen display color life of ground beef. Ground dairy cow lean is as color stable, and perhaps more stable, than ground beef cow lean providing the dairy cow lean is from reasonably color stable muscle. Application of these findings in combination with optimal cold-chain management could result in increased value of ground beef from beef and dairy cows. For more information, contact Liz Boyle (785-532-1247; [lboyle@ksu.edu](mailto:lboyle@ksu.edu)) or Melvin Hunt (785-532-1212; [hhunt@ksu.edu](mailto:hhunt@ksu.edu)).

- ↪ The rapid increase in feed cost has prompted questions about the **optimal market weight for market pigs**. Kansas State University has developed a spreadsheet that helps producers answer this question and a method to allow producers to customize the spreadsheet for their own marketing situation. The information can be found at: [www.KSUswine.org](http://www.KSUswine.org) under the “Marketing tools” link. Contact any of the swine specialists at KSU if you have any questions.
- ↪ **Increasing Flake Density Yields No Economic Advantage** - The study used 358 heifers that were fed corn-based diets with corn flaked to densities of 28, 32, or 36 lb/bushel. Feedlot performance and carcass characteristics, as well as mill efficiency, were measured.  
*The Bottom Line....* Mill production can be increased by flaking to higher density, but decreases in animal performance and loss of carcass weight outweigh the economic benefit of flaking corn to densities greater than 28 lb/bushel. For more information, contact Jim Drouillard (785-532-1204; [jdrouill@ksu.edu](mailto:jdrouill@ksu.edu)) or Chris Reinhardt (785-532-1672; [cdr3@ksu.edu](mailto:cdr3@ksu.edu)).
- ↪ **All market animals, commercial gilts, and commercial heifers** must be nominated to be eligible for the Kansas State Fair and/or Kansas Junior Livestock Show.
- 1) Steers and Market Heifers nominated with noseprint by May 1
  - 2) Lambs nominated with noseprint by June 15
  - 3) Hogs (Market hogs and Commercial Gilts) nominated with ear notches by June 15
  - 4) Meat Goats nominated with ear tag by June 15
- Multiple noseprints for each animal are recommended. This makes finding a legible print much easier. Initial nominations will again require a postmark by May 1 for steers and market heifers and June 15 for lambs, pigs, wether dam ewes, commercial breeding heifers and meat goats. All nominations must be complete within one month of nomination due date. This means all reprints and other corrections must be complete by June 1 for steers and July 15 for lambs, pigs, commercial breeding heifers and meat goats.
- The Extension Youth Web Site ([www.youthlivestock.ksu.edu](http://www.youthlivestock.ksu.edu)) is available to double check your records. For more information, contact Julie Voge ([jvoge@ksu.edu](mailto:jvoge@ksu.edu); 785-532-1264).
- ↪ The Department of Animal Sciences and Industry is seeking applications for the position of **Research Assistant, Cow-Calf Nutrition and Management** – This is a full-time, 12 month, term position. Major duties of this position will be to manage research projects dealing with the nutrition and management of beef cattle maintained on native rangeland. View the complete position announcement at [www.asi.k-state.edu/position](http://www.asi.k-state.edu/position). For more information, contact KC Olson, 785-532-1254; [kcolson@ksu.edu](mailto:kcolson@ksu.edu).
- ↪ **Impact of Slope and Pipe Diameter on Flush Plume Design** - Manning’s equation provides a method to evaluate the flow characteristics of a flush plume system used to move a diluted, sand-laden manure stream from a freestall building to sand or solid separation equipment. Evaluation of a 16, 18, and 24-inch plume showed pipe slope is critical in maintaining a 5 feet per second water velocity through the pipe. A 24 inch or larger plume placed on a 0.5% slope is able to obtain water velocity of 5 feet per second if the pump capacity exceeds 3,600 gpm. The flow velocity never reached or exceeded 5 feet per second in a 16- or 18-inch pipe placed on a 0.5% slope, regardless of the pump capacity. A 16-, 18- or 24-inch pipe laid on a 1% slope could obtain a water velocity of 5 feet per second if the pump capacity exceeded 1,500 gallons/minute. More information is available on this experiment in the Dairy Day 2007 publication. For more information, contact John Smith (785-532-1203; [jfsmith@ksu.edu](mailto:jfsmith@ksu.edu)) or Mike Brouk (785-532-1207; [mbrouk@ksu.edu](mailto:mbrouk@ksu.edu)).
- ↪ **Effects of  $\gamma$ -Butyrobetaine and L-Carnitine on Carnitine Concentrations in Various Muscle Tissues of Finishing Pigs** - The primary method of L-carnitine production, similar to the biological process that occurs in the liver and kidneys, is from microbial fermentation of  $\gamma$ -Butyrobetaine. Therefore, the objective of this study was to see if supplementing the diet with  $\gamma$ -Butyrobetaine would increase organ and muscle tissue carnitine concentrations. One-hundred-twenty-five barrows were fed diets containing either L-carnitine (100 ppm),  $\gamma$ -Butyrobetaine (100 ppm) or a combination of L-carnitine (50 ppm) and  $\gamma$ -Butyrobetaine (50 ppm). The addition of L-carnitine,  $\gamma$ -Butyrobetaine and the combination of L-carnitine and  $\gamma$ -Butyrobetaine increased free carnitine concentration in the longissimus, diaphragm, and heart. L-carnitine and the combination of L-carnitine and  $\gamma$ -Butyrobetaine increased free carnitine concentration in the kidney. Therefore, these results suggest that  $\gamma$ -Butyrobetaine and/or L-carnitine can be used to increase carnitine concentrations of organ and muscle tissues. More information is available on this experiment in the KSU Swine Day Report at [www.ksuswine.org](http://www.ksuswine.org). (This study conducted by J. M. Benz, J.L. Nelssen, M.D. Tokach, R D. Goodband, J.M. DeRouchey, and S.S. Dritz.)

↳ **The Effects Of Two True-Ileal-Digestible Lysine Concentrations, Optipak<sup>®</sup>, Ractopamine HCl (Paylean<sup>®</sup>), And Their Combinations, on the Growth Performance and Carcass Characteristics of Finishing Pigs Reared In Commercial Facility** - A total of 1,207 pigs (PIC, 337 × 1050) were used in a 28-d experiment in a commercial research barn to evaluate the effects of two true ileal digestible (TID) lysine concentrations, Optipak<sup>®</sup>, ractopamine HCl, and their combinations, on the growth performance and carcass characteristics of finishing pigs. There were 6 replicates per treatment (with the exception of one treatment that had 5), and 19 to 26 pigs per pen. Pigs were weighed at approximately 220 lb and allotted to six, corn-soybean meal-based dietary treatments. Four diets were formulated to 0.80% TID lysine: a control diet, the control diet with 5 lb/ton of Optipak<sup>®</sup>, the control diet with 4.5 g/ton of ractopamine HCl, or the control diet with both Optipak<sup>®</sup> and ractopamine HCl. The two remaining diets were formulated to 0.94% TID lysine and contained 4.5 g/ton of ractopamine HCl, with or without 5 lb/ton of Optipak<sup>®</sup>. The treatment structure provided for two 2 × 2 factorial arrangements of treatments. The first factorial utilized the four 0.80% TID lysine diets to evaluate the effects of Optipak<sup>®</sup> and ractopamine HCl. The second factorial utilized the four diets containing ractopamine HCl to evaluate the effects of TID lysine and Optipak<sup>®</sup>. Pigs fed diets containing ractopamine HCl had improved ADG, F/G, and final weight. In the diets containing ractopamine HCl, ADFI tended to be lower for pigs fed 0.94% TID lysine. There were no other differences in growth performance among the treatments. For carcass characteristics, plant live weight, hot carcass weight, and dressing percentage were improved for pigs fed ractopamine HCl. Additionally, loin depth increased when Optipak<sup>®</sup> was included in the diet. This experiment provides further evidence that ractopamine HCl improves late-finishing growth performance, hot carcass weight, and dressing percentage. Although Optipak<sup>®</sup> did not improve growth performance, it increased loin depth. The different responses to ractopamine HCl and Optipak<sup>®</sup> suggest that the incentives for justifying their use need to be evaluated independently. More information is available on this experiment and others in the KSU Swine Day Report at [www.ksuswine.org](http://www.ksuswine.org). (*This study conducted by J. R. Bergstrom, M. D. Tokach, S. S. Dritz, J. L. Nelssen, J. M. DeRouchey and R. D. Goodband.*)

↳ **Effects of PCV2 Vaccine on the Growth Performance of Pigs and Mortality Rate in a PCV2 Positive Commercial Swine Herd** – A total of 1,470 pigs were used to study a commercial sow herd with a history of Porcine Circovirus Disease (PCVD). The objective was to evaluate the effect of two commercially available Porcine Circovirus Type 2 (PCV2) vaccines on growth and mortality rates. The first vaccine was administered one week after weaning (1-dose) while the second was administered at weaning and repeated three weeks later (2-dose). A third group of unvaccinated pigs served as a control group. Pigs were individually weighed at weaning (d 0), d 113, 143, and just prior to market. On d 113, pigs on the 2-dose treatment were heavier ( $P < 0.05$ ) than the control group, and the 1-dose treatment pigs were intermediate. At d 143, just prior to when the first pigs were marketed, both the 1-dose and the 2-dose pigs were heavier than the control pigs by 7.6 and 10.2 lb ( $P < 0.05$ ), respectively, and there were no significant differences in weights between the two vaccinated groups. However, differences in weights between the vaccinated and the control pigs were smaller at off-test compared to differences at d 143 due to a wider variability in on-test days as a result of multiple marketing days prior to end of the trial. Although there were no significant differences between the two vaccinated groups, ADG was greater ( $P < 0.05$ ) in all vaccinated pigs compared to non-vaccinated control pigs from d 0 to d 113, d 143, and at off-test. From d 113 to 143 and until the day they were taken off test, there were no differences in ADG, regardless of treatment. This suggests that the increase in growth rate in vaccinated pigs occurred during the period d 0 to 113. Barrows consistently exhibited greater ADG and heavier weights ( $P < 0.05$ ) than gilts throughout the trial. No significant differences in mortality rate between treatments were observed but both vaccinated groups had mortality rates that were 3% lower than the non-vaccinated control pigs. Based on these results, both commercial vaccines were effective in mitigating the effects of PCV2 virus and improving the growth performance of pigs in a PCV2 positive herd. More information is available on this experiment and others in the KSU Swine Day Report at [www.ksuswine.org](http://www.ksuswine.org). (*This study conducted by J. Y. Jacela, S. S. Dritz, M. D. Tokach, J. M. DeRouchey, R. D. Goodband, J. L. Nelssen, R. C. Sulabo, and J. R. Bergstrom.*)

# UPCOMING EVENTS...

- ↪ The 2008 **Annual Meeting of the Midwestern Sections of the American Dairy Science Association and the American Society of Animal Science** will be held March 17 to 19, 2008, in Des Moines, IA. Some excellent symposia and invited presentations are planned. For more information, visit the website at <http://adsa.asas.org/midwest/2008/>.
- ↪ A **Livestock Fair Management Clinic** will be held March 26 at Emporia and March 27 at Scott City. This clinic is designed for Extension agents and local volunteers involved in livestock fair management and leadership. This professional development opportunity consists of an activity filled day to increase awareness and knowledge and provide a forum for open communication for individuals working with livestock fairs across Kansas. Both Agriculture and 4-H agents are invited to attend, as well as a local volunteers if appropriate.

Registration fee for the clinic is \$10 per participant and is due by March 18. For an agenda and registration form, visit the Research and Extension page on our website at [www.asi.ksu.edu](http://www.asi.ksu.edu) under Upcoming Events. For more information, contact Joel DeRouchey ([jderouch@ksu.edu](mailto:jderouch@ksu.edu); 785-532-2280).
- ↪ **Putting the Fun Back Into the 4-H Profession** is the theme for this year's KAE4-HA Spring Meeting. The meeting will be held April 8-9, 2008, at the Grand Prairie Hotel and Convention Center in Hutchinson. This is a great opportunity for anyone looking to put a little pizzazz into your profession. Nationally known speaker, Dr. Jeff Goodwin, Colorado State 4-H Program Leader, will provide the educational workshops. Any Extension professional is welcome to attend. Registration is due by March 20. Details can be found at <http://www.oznet.ksu.edu/kae4ha>.
- ↪ In conjunction with the 2008 KAE4-HA Spring Conference, Dr. Jeff Goodwin, Colorado State 4-H Program Leader, will be presenting "**Effective Livestock Quality Programs**" on Wednesday, April 9 at 1:30 p.m. at the Grand Prairie Hotel in Hutchinson, Kansas. Anyone involved in youth livestock programming is encouraged to attend this presentation. Pre-registration is \$10 and is due on March 20. For a registration form and more information, visit <http://www.oznet.ksu.edu/kae4ha>.
- ↪ The **Kansas Wildlife Habitat Evaluation Contest** will be held Wednesday, April 9, 2008, at the Maxwell Wildlife Refuge, Canton, Kansas. For more information, contact Charles Lee (785-532-5734; [clee@ksu.edu](mailto:clee@ksu.edu))
- ↪ **Research Roundup to be held in Hays on April 17, 2008** - The 2008 Research Roundup at the Agricultural Research Center in Hays will be returning to the demonstration arena at the feedlot for its annual program which begins with registration at 11:30 a.m. on Thursday, April 17th. An overview of ongoing research projects including relationships between marbling and loin muscle depth on cow productivity, preconditioning and weaning management, sensors to monitor illness in cattle and a walking tour will all take place onsite at the feedlot. The program continues in the auditorium with discussion of a variety of research projects involving topics such as Vitamin A, stocker options, zilpaterol, choline and preconditioning. The keynote presentation will be from Jim Drouillard, ruminant nutritionist with KSU summarizing recent studies on use of distiller's byproducts. For more information, call John Jaeger at 785-625-3425.
- ↪ The National Junior Swine Association will hold its 7<sup>th</sup> annual national **Youth Leadership Conference** in San Antonio, Texas on May 9-11, 2008. Youth ages 14-21 will be challenged to make the most of their opportunities in life while broadening their knowledge in important swine industry issues at this conference.

The conference fee is \$125 which includes rooms, meals, activities and a t-shirt. Applications are due to the NSR office by April 9. For an application form or more details visit, [www.nationalswine.com](http://www.nationalswine.com). For more information, contact Julie Voge ([jvoge@ksu.edu](mailto:jvoge@ksu.edu); 785-532-1264).

↳ The **International Symposium on Beef Cattle Welfare** has been scheduled for May 28-30, 2008, at the Forum Hall in the K-State Student Union in Manhattan, Kansas. This symposium is a direct function of the Beef Cattle Institute at KSU. The mission of this symposium is to understand the strides that have been made by the beef industry for the welfare of cattle and discuss new areas of opportunities for improvement. Make plans now for this landmark event.

This symposium is proud to provide a venue to highlight the world's experts on beef cattle welfare. Speakers for the symposium range in areas of expertise and responsibility. Speakers will include producers, nutritionists and veterinarians that speak on current issues in the beef industry. The speaker list also includes people in policy making positions within the federal government, professional societies and industry commodity groups. Lead research specialists from around the globe will discuss current research findings and future research needs in beef cattle behavior and welfare.

For a complete schedule of events and registration form, visit [www.isbcw.beefcattleinstitute.org](http://www.isbcw.beefcattleinstitute.org). For more information, contact Wrenn Pacheco at the Beef Cattle Institute (785-532-4844; [wpacheco@vet.ksu.edu](mailto:wpacheco@vet.ksu.edu)) or Chris Reinhardt (785-532-1672; [cdr3@ksu.edu](mailto:cdr3@ksu.edu)).

↳ A full day presentation on **Cattle Welfare Through Proper Cattle Handling** will be held on Wednesday, May 28, 2008, from 10:00 a.m. to 4:00 p.m. in conjunction with the International Symposium on Beef Cattle Welfare. This presentation will be held in Weber Arena on the KSU Campus and will highlight concepts that empower caregivers in the beef industry to create positive relationships with cattle. The presentation and demonstration will include video footage and live cattle interaction in an arena complete with processing facilities. Presenters include Lynn Locatelli, DVM, Tom Noffsinger, DVM, Clint Hoss and Curt Pate.

Topics to be discussed include: understanding prey animal instincts; the use of position, distance, angles and speed to communicate with cattle; teaching cattle to respond in a positive manner, exercise therapy; relationship of horsemanship and stockmanship; and much more. For complete details and registration information, visit [www.isbcw.beefcattleinstitute.org](http://www.isbcw.beefcattleinstitute.org) and click on registration. If you have any questions, please feel free to call the Beef Cattle Institute at 785-532-4844 or e-mail Wrenn Pacheco at [wpacheco@vet.ksu.edu](mailto:wpacheco@vet.ksu.edu).

↳ **Developing and Implementing Your Company's HACCP Plan** for meat, poultry, and food processors will be held June 11-13, 2008 in Weber Hall, Kansas State University, Manhattan. Registration for the 2.5 day International HACCP Alliance accredited workshop is online at <http://animalscience.unl.edu/haccp/>. The workshop fee is \$250, and meets USDA training requirements to become a HACCP trained individual. For more information, contact Dr. Liz Boyle at [lboyle@ksu.edu](mailto:lboyle@ksu.edu).

↳ Dates have been changed for the **2008 Dr. Bob Hines Swine Classic**. The Classic will be held July 11-12, 2008 at CiCo Park in Manhattan. Watch for more information.

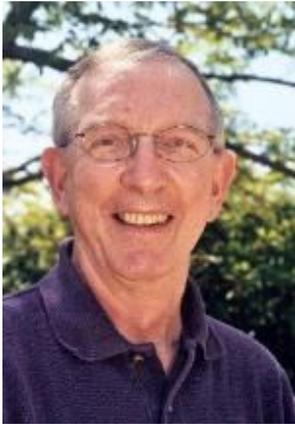
<b>CALENDAR OF UPCOMING EVENTS</b>		
<b>Date</b>	<b>Event</b>	<b>Location</b>
March 17-19, 2008	Midwestern Section ADSA and ASAS	Des Moines, Iowa
March 26, 2008	Livestock Fair Management Clinic	Emporia
March 27, 2008	Livestock Fair Management Clinic	Scott City
April 5, 2008	High Plains Horseman's Day	Oakley
April 8-9, 2008	KAE4-HA Spring Meeting	Hutchinson
April 9, 2008	Effective Livestock Programs	Hutchinson
April 9, 2008	Kansas Wildlife Habitat Evaluation Contest	Canton
April 17, 2008	Research Round-Up	Hays
May 9-11, 2008	NJSA Youth Leadership Conference	San Antonio, Texas
May 28, 2008	Cattle Welfare Through Proper Cattle Handling	Manhattan
May 28-30, 2008	Symposium on Beef Cattle Welfare	Manhattan
June 11-13, 2008	HAACP Training	Manhattan
July 11-12, 2008	Kansas Swine Classic	Manhattan

# AS&I FACULTY SPOTLIGHT



**Evan Titgemeyer (etitgeme@ksu.edu; 785-532-1220)**  
**Professor/Interim Research Coordinator & Graduate Program Director**

Evan Titgemeyer grew up on a small family farm in northwest Ohio. Following completion of a B.S. degree at The Ohio State University (1984), he completed both M.S. (1986) and Ph.D. (1989) degrees at the University of Illinois. His graduate work was under the direction of Dr. Neal Merchen and focused on determining amino acid requirements of growing cattle; this is an area of research where he is still active. Following post-doctoral training with Dr. George Fahey, Jr. in the area of fiber chemistry, he was hired as a faculty member at Kansas State University in 1992, and he is currently a professor in the Department of Animal Sciences and Industry, with specialization in the area of ruminant nutrition. His current appointment is 70% research and 30% teaching. He has recently agreed to serve as the Interim Research Coordinator and Graduate Program Director for approximately one year.



**Melvin Hunt (hhunt@ksu.edu; 785-532-1232)**  
**Professor/Chair Food Science and Industry**

Melvin Hunt, or Hunter as he is known, has been part of the ASI faculty since 1975. Prior to joining KSU he was a Research Chemist at the Tennessee Eastman Company, Kingsport, TN. His responsibilities include research (50%) and teaching (50%) of undergraduate and graduate meat and food science courses and he currently is Chair of the Food Science and Industry Undergraduate Program. His Ph.D. was in Food (Meat) Science from the University of Missouri.

Class instruction includes: Food Science Senior Seminar, Principles of Meat Science (Distance Learning), Meat Science, Processed Meats Operation, and Advance Meat Science. He has been teaching via distance learning since 1988 and has cooperated with industry in making a series of videos useful for training and customer relations.

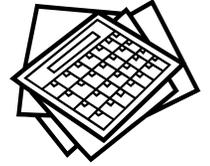
His research at KSU has focused on postmortem meat quality with particular interest of factors affecting meat color and myoglobin chemistry. Specific areas of research included: Cooked meat color and safety, Enhancement of fresh beef and pork, Case-ready packaging (CO-MAP, Lo-O<sub>2</sub> MAP, Hi-O<sub>2</sub> MAP and vacuum), Myoglobin color stability and lighting, Discoloration of bone, Color stabilizing mechanisms in meat, Color measurement methodology, and Dry-aging of beef. Hunter also has worked with low-fat ground beef and sausage, and collagen effects in meat texture and he continues to dabble in muscle histochemistry.

Dr. Hunt has received numerous awards for teaching, research and student services. He has been Chair of the Muscle Foods Division of the Institute of Food Technologists, Chair of the Meat Science-Muscle Biology Section of the American Society of Animal Science, Chair of the Reciprocal Meat Conference, and President of the American Meat Science Association.

In his spare time, he enjoys photography, O-gauge model trains, and travel (either African safaris or attending the International Congress of Meat Science and Technology).

# WHAT PRODUCERS SHOULD BE THINKING ABOUT...

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



### **BEEF** -- Cowherd Tips by *Twig Marston, K-State Beef Extension Specialist, Cow/Calf*

- 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 anestrous (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](mailto:lschrein@ksu.edu), or phone 785-532-1267.