

Beth Young fills swine veterinarian vacancy

By Michelle Proctor, Senior Information Specialist



Dr. Beth Young

The University of Missouri Extension Commercial Agriculture Program has employed Dr. Beth Young, DVM, DVSc, of Ontario Canada as the Swine Focus Team veterinarian. She joined the staff on March 15 of this year.

Before coming to the University of Missouri, Dr. Young had been a post-doctoral fellow at the Department of Population Medicine, University of Guelph in Guelph, Ontario since 2005. She received a Bachelor of Science in Animal Biology from the Ontario Agricultural College, University of Guelph, graduating with honors in 1997.

In 2002 she earned a Doctor of Veterinary Medicine degree from the Ontario Veterinary College, also at the University of Guelph. Young went on to earn a Doctor of Veterinary Science in Swine Health Manage-

ment from the Department of Population Medicine at the University of Guelph in 2005. Dr. Young's thesis for her DVSc was "A study of management factors associated with farrowing rate in commercial sow herds in Canada."

She was a guest lecturer at the Commercial Agriculture Program's Swine Institute in Columbia in November, 2008. At the Institute, her topic was identification, management and containment of PRRS and PCV2 diseases in pig herds in Canada. Dr. Young's studies contributed to the development of a vaccine to control the outbreak.

When asked what inspired her to pursue an education in this area, Young replied, "I inherited a passion for teaching from my father. He dedicated his working life to teaching geography to high school students. Teaching swine medicine to veterinary students can be a difficult task. Many students do not come from a rural background, are not interested in practicing swine medicine and, in some cases, come into the classroom already having formed a negative opinion of the swine industry."

Recognizing this, Young included a variety of teaching techniques to help motivate those students wanting to learn the material and also to accommodate different learning styles. She presented case studies for students to work through in order to improve their problem-solving and critical thinking skills.

"Part of creating a positive learning environment

includes showing respect for the students," said Young. "I want students to feel comfortable and confident enough to ask questions and voice their opinions. This type of interaction has led to many interesting discussions and in many cases, I have learned just as much from these discussions as the students have."

The Commercial Agriculture swine focus team is an interdisciplinary group of economists, engineers, nutritionists, geneticists and veterinary medicine swine specialists who conduct applied research and develop and deliver advanced educational programs and seminars to veterinarians and swine producers.

The swine team also provides producers with on farm assistance in expanding and operating units in an environmentally sound manner in accordance with current DNR regulations.

Dr. Young will be responsible for developing statewide programs related to swine health and reproduction. She will visit swine farms throughout the state to provide consultation on problems and gather data that could be used in solving critical problems facing the swine industry.

"Working with producers through extension will give me the opportunity to take what I have learned to those whose interests are focused and will benefit most," she said. My job will allow me to work with people who will use swine management research directly to improve the health of their herds as well as the health of their business."

Missouri irrigators increase their skills

By Dr. Joe Henggeler, University of Missouri Delta Center

This year marks the 12th year of irrigation research and extension at the University of Missouri Delta Center as part of the Commercial Agriculture Program. In the decade prior to the program's inception, irrigation was borderline profitable and was boosting yields over dryland by only 46 bushels per acre more corn, 11 bushels per acre more soybeans, and 175 pounds per acre more cotton. Since starting the program, the irrigation yield advantage over dryland (non-irrigated) increased the former levels by 14% and 32% for corn and cotton, and a staggering 61% for soybeans.

In 1997, irrigated soybean growers yielded about 40 to 45 bushels per acre and few corn irrigators ever surpassed 200 bushels. Today MU's annual Bootheel irrigation survey shows that some farmers are now making 60 and 70 bushels of soybean per acre, while most corn growers today beat the 200 bushel mark. In 2007 and 2008 over half of the respondents reported soybean yields of 55 or more bushels per acre, and about the same amount had yields of 200 or more bushels per acre.

Bootheel irrigators have become better irrigators. One of the main reasons is that more irrigators are using irrigation scheduling methods, such as AgEBB's Woodruff Irrigation Chart Maker (<http://agebb.missouri.edu/irrigate/woodruff/>). Another reason is that irrigators have increased the number of times per season that they apply irrigation; they start watering earlier and don't wait for signs of stress like leaf curling, and they are also continuing to make applications later than they had in the past.

The yield jump a farmer gets on the irrigated portions of his farm over the yield from the non-irrigated portions is termed the irrigation yield bump or IYB.

IYB is important since it is this that must pay for all the irrigation investment costs. The current investment cost in the Bootheel—both fixed and variable—averages a little over \$100 per acre for soybeans and cotton, and soars to \$185 per acre for corn. If a farmer doesn't make that in extra crop yield, irrigation is losing him money.

The IYB also reflects how well an irrigator knows his business. Varieties and methods improve over time,

but they do so for both irrigated and dryland production, thus leaving the IYB as the ultimate report card on irrigation skills. As mentioned earlier, the IYB today is 14 to 61 percent higher than it was a decade ago. Assuming corn at \$3.50/bu, soybeans at \$9.00/bu, and cotton at \$0.75/lb, and with 400,000 irrigated acres in the Bootheel of corn and soybean each, and 250,000 irrigated acres of cotton, the increased irrigation skill level of today's Bootheel farmers results in gross profit levels for the region increasing by \$38 million dollars annually.

Although I take pride in the added income for Missouri irrigators, I am most proud that Missouri corn irrigators today routinely exceed the 200 bushel per acre corn plateau. The 200 bu/acre corn yield used to be like the four-minute mile.

When I arrived at the Delta Center in 1997, Dr. Don Pfost, a long-time extension agricultural engineer, pointed out to me that Missouri irrigators were struggling to routinely break this barrier. I set this as my priority goal, and it looks like we have reached it.

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Managing genetic defects in beef cattle

By Dr. Bob Weaber, State Extension Specialist - Beef Genetics

Over the last five years the beef seedstock sector has had to deal with a number of recessive genetic defects. The use of assisted reproductive technologies including embryo transfer and artificial insemination has allowed breeders to concentrate selection to a relatively small number of animals.

While many breeders avoid matings of half-sibs or sires to daughters to reduce the accumulation of inbreeding, it is not unusual for very prominent sires to appear several generations back in pedigrees of both the sire and dam of a particular individual. In these circumstances there is an increased chance for the appearance of a progeny affected by a recessive genetic defect.

Autosomal recessive genetic defects are inherited congenital abnormalities. These genetic mutations occur on one of the 29 pairs of autosomal (non-sex coding) chromosomes. Animals that inherit a single defective or mutated gene and one normal copy of the gene are called heterozygotes and are not affected by the disease, but are carriers of the defect, passing it on to half of their progeny on average.

Animals that have two copies of the normal or unmutated gene are called homozygous normal. Animals that inherit two copies of the defective gene are homozygous for the recessive forms of the gene and are phenotypically affected by the abnormality.

The carriers (heterozygotes) and homozygous normal animals do not exhibit the deleterious condition and are phenotypically indistinguishable. The fact that the normal animals and heterozygotes are indistinguishable makes phenotypic selection to eliminate defect carriers ineffective.

To illustrate this difficulty in phenotypic selection to eliminate recessive carriers, consider a more com-

mon trait like coat color. Both homozygous black animals and heterozygous black (red carriers) are phenotypically black and indistinguishable. Only when two black animals produce a red calf can we infer the genetic makeup of the color parents as both being heterozygotes (red carriers).

All breeds carry some genetic defects. Presumably some of the autosomal recessive lethal genetic conditions affect embryos during gestation and cause early embryonic loss. These defects are difficult to detect and may simply be diagnosed as 'reproductive failure.' A number of defects have been documented in beef breeds, several quite recently.

A brief description of several genetic defects are listed below. Due to space limitations this is not a complete listing of defects.

Management of genetic defects in seedstock or commercial beef herds can be quite challenging. In the case of seedstock herds, suspect animals or those known to be the progeny of carriers should be tested when DNA diagnostic tools are available and economically practical.

Carrier animals maybe retained in the breeding herd, but breeders should test all progeny to determine carrier status prior to marketing as breeding stock. Carrier calves should only be sold to feeders and designated for slaughter only.

Table 1 details the expected results if a homozygous normal sire is mated to a carrier (heterozygote) cow. The resulting progeny will include, on average, one-half defect free and one-half carrier calves with no affected calves. Also included in Table 1 is the expected proportion of progeny of various genotypes when a carrier sire is mated to a carrier dam.

On average one-quarter of the calves will be free

of the defect, one-half will be carriers and one-quarter will be affected. If the animals are affected by a lethal defect, the surviving animals will include one-third defect free calves, and two-thirds will be carriers of the defect.

If you have a calf born with a suspected congenital defect, photograph the affected calf and contact your breed association immediately to arrange for tissue collection and reporting instructions.

In a commercial herd that has had affected calves or is striving to prevent introduction of a known defect, bulls should be DNA tested as the primary means of control. Mating of carrier cows to non-carrier or clean bulls will result in the production of no affected calves.

It is frequently not economically practical to cull commercial cows on the basis of their carrier status. If a DNA test is available, all new sire purchases or semen used for AI (artificial insemination) should be from sires that are not carriers. Non-carriers may also be determined by pedigree if both sire and dam have tested free of the defect. If a DNA test for a defect is not available, the strategic use of a planned crossbreeding system may eliminate the appearance of affected calves.

Care should be taken to select a breed that has not had any calves produced in recent generations that are affected by the same defect one is trying to eliminate. At the commercial level, autosomal recessive defects can be effectively managed through careful sire and/or breed selection without extensive culling of the beef cow herd.

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Condition	Description	Breeds Affected
Tibial Hemimelia (TH)	DNA test available to identify carriers.	Shorthorn Maine-Anjou Chianina
Pulmonary Hypoplasia with Anasarca (PHA)	DNA test available to identify carriers.	Shorthorn Maine Anjou Chianina
Ideopathic Epilepsy (IE)	A neurological disorder in which affected calves have seizures.	Hereford
Arthrogryposis -Multiplex (AM)*	Many environmentally caused forms appear but one form is inherited as a simple recessive trait. The joints of all four legs are fixed symmetrically and a cleft palate is present. AM in Angus includes twisted malformation of spine and fixed leg joints. DNA test available to identify carriers.	Charolais Angus*
Dwarfism	At least three types of dwarfism documented in cattle and thought to be caused different simply inherited recessive genes.	Angus Hereford Brahman Dexter
Hypotrichosis (Hairlessness)	Partial to complete lack of hair. Hair grows in and falls out so affected animals may have varying appearance over time.	Hereford
Protoporphyrria	Light sensitivity causing open sores and scabs. Liver function is also affected and animals may suffer from seizures. Inherited as simple recessive. DNA test available to identify carriers.	Limousin
Osteopetrosis (Marble Bone)	Long bones are solid and without developed marrow. Bones are brittle and break easily. Calves are usually born dead 2 to 4 weeks pre-term. DNA test available soon for Red Angus.	Angus Red Angus Holstein
Hydrocephalus -Internal * -External **	Excessive fluid in brain ventricles (internal) or in cranium (external).	Angus** Hereford* Many other breeds

Table 1. A.) Expected calf genotypic frequencies from mating of non-carrier sire to carrier dam for deleterious recessive genetic defect. B.) Expected calf genotypic frequencies from mating of carrier sire to carrier dam.

A.

Carrier Dam Genotype (Aa)	Non-carrier Sire Genotype (AA)	
	A	A
A	AA	AA
a	Aa	Aa

Genotypes	Frequency
AA (homo. Normal)	50%
Aa (hetero. Carrier)	50%
aa (Homo. Recessive Affected)	0%

B.

Carrier Dam Genotype (Aa)	Carrier Sire Genotype (Aa)	
	A	a
A	AA	Aa
a	Aa	aa

Genotypes	Frequency
AA (homo. Normal)	25%
Aa (hetero. Carrier)	50%
aa (Homo. Recessive Affected)	25%

Phenotypes	Frequency	Frequency in Surviving Calves
AA (Normal)	25%	33%
Aa(Normal)	50%	67%
aa (affected-dead)	25%	NA

A = Normal genotype

a = Defective/mutated genotype

Distillers grains use and distribution project

By Dr. Justin Sexten, Beef Nutritionist

This winter the University of Missouri Extension Commercial Agriculture Program, Missouri Corn Merchandising Council, and Missouri Cattle and Corn Steering Committee partnered to conduct a survey regarding producer supplemental feed use preferences.

The survey, part of a USDA Value-Added Producer Grant, evaluates beef producer preferences for supplemental feed source, form and volume. After 36 meetings with 1,989 producers in attendance, 507 surveys have been returned. Opportunities to participate in the supplemental feed survey will continue through the summer at various Extension meetings.

Dry distillers grains (DDGS) distribution in seed totes is a companion part of the grant to evaluate an alternative option for distributing DDGS in smaller volumes. Producers have consistently reported DDGS are difficult to handle and many cannot receive 25 ton truck loads. Survey responses have indicated if distillers grains were as easy to handle as round bales of hay, producers may expand distillers grains use. Filled totes can be handled much like a bale of hay using a forklift or tractor.

Regional extension livestock specialists,

Eldon Cole, Gene Schmitz, Gary Naylor, Ben Davis, Bill Doig and Wendy Flatt have been involved with coordinating the distribution projects at LaRussel, Versailles, Buffalo, Farmington, Thayer, and Boonesboro.

Producers who participate in the project are given totes filled with approximately 1,500 pounds of DDGS. After transporting and feeding the DDGS from the tote, producers are sent a survey to evaluate seed totes as a handling and distribution method for DDGS.

The Southwest Center hosted a field day February 17, where producers were invited to ask questions about distillers grains in addition to viewing soft and hard sided totes. Orbis Corporation donated the use of a hard sided tote, equipped with a hopper bottom, to demonstrate another method of storing and feeding of DDGS in smaller volumes.

Survey results from the supplemental feed questionnaire and seed tote project will be summarized in early fall to evaluate opportunities to expand use and improve handling of Missouri distillers grains for cow-calf producers.



Soft sided tote and hard sided tote with hopper bottom



Soft sided tote on tractor



Cotton waiting to be harvested



Cotton flower and boll

Missouri's cotton crop

By Dr. Gene Stevens, MU Extension Agronomist

MU researchers have spent years making cotton an important industry in Missouri. At the MU Delta Center in Portageville, research scientists help Southeast Missouri cotton farmers grow top cotton yields. The Delta Center is part of the MU Agricultural Experiment Station and a research arm of the College of Agriculture, Food and Natural Resources.

Although we often think of agriculture as just food and feed, we forget about the fiber in the clothes we wear. In the counties south of Cape Girardeau, Missouri farmers produce around 300,000 acres of cotton. That's enough fiber to produce 129 million blue jeans each year from Missouri cotton. Over the years, American consumers have grown to prefer cotton over synthetic fibers for comfort because of cotton's natural softness. Most of our underclothes, socks, and sweatshirts are 100% cotton. And, cotton is often blended 60/40 with other fibers in shirts and coats.

MU scientists at the Delta Center evaluate new technologies for cotton farmers such as prescription fertilizer applicators that vary the rate of nutrients for cotton plants. Light sen-

sors on field equipment automatically measure the "greenness" of cotton leaves, process the information in a computer, and apply the correct fertilizer rate based on plant need in a specific area of the field.

This saves cotton farmers money and conserves natural resources and energy. Researchers also study the most effective methods of controlling pests such as the boll weevil. Over the last six years, Missouri cotton farmers have eradicated this pest from their fields, thanks to management practices developed by cotton researchers.

Cotton farmers still use gins located in the Delta to separate the lint fiber from the seed. About 60 percent of the cotton weight is seed which is crushed into oil and meal. Cottonseed oil is used in cooking oil, shortening and salad dressing.

In the sharecropper days, cotton farmers often judged their crop by how tall the plants were. Short plants usually meant low yields. From this, a farmer's expression was coined: "standing in high cotton," to mean good success in life.

First annual Stocker/Backgrounder Institute held in Harrisonville

By Michelle Proctor, Senior Information Specialist

Dr. Craig Payne, University of Missouri Extension Commercial Agriculture Program veterinarian, organized the first annual institute for producers interested in stocker/backgrounding operations. The one day event cost participants \$50 and was held in Harrisonville.

Opportunities

Joe Horner, Commercial Agriculture's beef economist, opened the program with a presentation on opportunities in the field. Analyzing challenges and opportunities in Missouri, Horner said, "Stocker enterprises are ideal for cattlemen who have extra time during the year to work cattle, have good quality forage available, and who want to have a flexible cattle business."

Missouri's physical proximity to most of the nation's major beef processing plants, make the state prime territory for developing stocker/backgrounding businesses.

Horner compared traditional stocker strategies such as buying odd lots of low cost calves of unknown genetics, buying during market dips or seasonal price slumps, and buying in low cost regions and markets, to emerging strategies.

Regarding procurement, Horner advised, "The new strategy warrants buying consistent calves from herds with genetic merit, creating relationships with cow-calf producers and seedstock suppliers, and offering premiums or percentage retained ownership."

Traditionally, stockers created value by dehorning, castrating and tagging cattle, sorting them by breed, weight, color and condition. Stockers would vaccinate, precondition and feed for low cost gain. Low cost co-products, raised pasture, hay or silage were used by stockers to grow their herds.

"The emerging strategy calls for age and source verification, commingling cattle for vaccinations and preconditioning, and maintaining rapid growth to finish at a young age," said Horner. He recommended attaching performance and production protocol data via ear tags.

To capture value, Horner suggested selling to specific buyers who are looking for performance and production protocol data.

"The emerging strategy calls for marketing the cattle through a value-based alliance for premiums rather than using hedging, options-forward contracting, or buying and selling on market to manage price risks, as with traditional strategies.

"Find your unfair advantage," he told his audience. "Work with a smart vet, play seasonal markets and most importantly, find someone who is really good at what you are not."

Horner referred all present and potential stocker/backgrounding operators to the University of Missouri Commercial Agriculture Program website <http://www.agebb.missouri.edu/beef> for the Missouri Beef Resource Guide.

A new feature, the Missouri Beef Backgrounding Budget, <http://agebb.missouri.edu/beef/tools/index.htm>, has been designed to allow users to enter batches of calves coming from different sources, estimate feed, processing, and other operating costs. The site also offers a yardage calculation tool, a beef backgrounding profitmeter and other decision making tools.

Keys to receiving cattle nutritional programs

Dr. Justin Sexten, University of Missouri Extension

Commercial Agriculture Program beef nutritionist, gave a presentation on "Receiving cattle nutrition: the first 28 days".

Dr. Sexten began with the nutritional considerations of stocker/backgrounding cattle. "This is a predominately forage driven enterprise, comprised of storage forage with supplements and grazed forage. Stockers must transition cattle from a 100% forage diet to feedlot rations."

Sexten told the attendees, "During the first 28 days, performance, health and death are the greatest management uncertainty." This is true regardless of whether or not the cattle have been preconditioned before or after shipment.

Stockers must consider if the cattle have experienced high stress from a long-haul and then, provide low dry matter intake. Or, if the cattle have endured only a short-haul from a local market, they can receive higher dry matter intake earlier.

The amount of dry matter intake should be figured as a percentage of body weight, starting with 0.5 to 1.5 percent during the first week of receiving. In the second week, that intake can be increased to 1.5 to 2.5 percent of body weight. For the next 14 days, dry matter intake should be increased again to 2.5 to 3.5 percent of body weight. "The goal is to achieve at least 2 percent as fast as possible," said Sexten.

He stressed the importance of getting water to the cattle within the first six to eight hours following arrival. "If they don't drink, they will die. Dry matter intake is optimized by giving them water. A belly full of water will not inhibit them from wanting feed, as feed is energy."

Regarding hay and supplement feeds during receiving, Sexten assured the audience that cattle prefer and do better (average daily gain—ADG) with increased feed concentrates, with or without hay. "Since cattle are attracted to hay, use the best hay that you have or go get better hay," said Sexten. "The best forage to concentrate ratio is 75% concentrate."

The importance of protein in the diet was emphasized. "Crude protein represents nitrogen in the feed. Degradable protein is important as rumen microbes use it to form microbial protein," stressed Sexten. Undegraded protein by-passes the rumen and is absorbed in the lower tract.

Higher crude protein concentrations are imperative during the first two weeks of receiving. If cattle have low levels of intake, add higher nutrient supplements. Distillers grains contain approximately 55 percent of rumen undegraded protein (RUP).

"Stressed cattle will benefit from higher potassium levels," said Sexten. "Higher doses of zinc and copper are also recommended, especially during the first week. Raising vitamin A and E levels to 2000-3000 IU/lb. and 75-100 IU/lb., respectfully, are a good idea for long haul cattle where you don't know much about their background.

"When administering feed additives, prepare for subclinical coccidiosis control," said Sexten. "Coccidiostat and Ionophore are two options to use."

In selecting supplement ingredients, stockers should focus on low starch co-products when feeding forage based feeds. Corn grain is high in starch (75%). Distillers grains (16%), soybean hulls (14%) and corn gluten (20%) feeds have lower starch content. The potential for acidosis decreases with less starch, as there

is less opportunity for fermentation.

Other recommendations for general receiving management include providing adequate pen size. Pens should be large enough to prevent overcrowding yet small enough to minimize walking, dust, and to allow feed and water discovery. "Cattle walk the perimeter," reminded Sexten. "Offer them grass hay in bunks to draw them to the feed supplements. Also, try to feed multiple times during the day to encourage calves to come to the bunk."

In Summary:

- Provide water on arrival
- Target dry matter intake at 2 percent body weight
- Formulate receiving diets to supply adequate nutrients at low feed intake
- 55 to 75 percent concentrate
- 12.5 to 14.5 percent crude protein with 60 percent RUP
- Modify mineral supplements for increasing intake
- Use feed additives suited to situation
- Select supplement ingredients to match diet needs

The vet's view

Following Sexten, were presentations by veterinarians Mike Nichols, US Beef Veterinary Operations for Pfizer Animal Health and Shaun Sweiger, a private feedlot/stocker consultant.

Outlining reasonable goals for the participants, Dr. Nichols discussed pathogen dynamics and bio-containment in stocker cattle operations. "Your goals are maintaining performance of the cattle, maintaining operational efficiency, improving operational flexibility, reducing the impact of disease on the business and on business decisions, and maintaining and improving quality of life," he said.

Nichols stressed the importance of choosing sites for the new arrivals, so that pens for the sick and chronically ill would not exacerbate the existing problems of recently transported cattle.

He introduced interactive polling devices with which the audience voted on answers to problem situations. There was a variety of opinion as to where the sick pen should be located. Dr. Nichols posed the question, "Is convenience to loading areas the main priority or should isolation from healthier cattle come first?"

Dr. Shaun Sweiger also made use of the interactive devices on several subjects, i.e., what is the biggest challenge to success in the cattle business; how to assess or evaluate sick cattle.

Talking about the pros and cons of using antibiotics, Sweiger said, "A trip to the hospital does not have to include antibiotics to be successful. Just because you've pulled him, he doesn't have to be sick. You have to remember that antibiotics can have a negative effect on rumen microflora and can cause injection site problems. Unnecessary treatments are costly and not all conditions respond to antibiotics."

The stocker conference concluded with Tom Gallery of Bartlesville, Oklahoma, Beef Magazine's 2007 National Stocker Award recipient. Gallery gave a history of how technology and cooperation with veterinarian Shaun Sweiger brought the Gallery Ranch operation into the modern era. (See related article on page five of this issue.)

Tom Gallery, 2007 National Stocker Award, Backgrounding Division

By Michelle Proctor, Senior Information Specialist



Tom Gallery

Tom Gallery of the Gallery Ranch in Bartlesville, Oklahoma was awarded the 2007 National Stockers Award in the backgrounding/drylot division, by Beef Magazine.

Gallery spoke about his life experience with cattle at the Stocker/Backgrounding Institute in Harrisonville. He discussed the Gallery Ranch operation, with an emphasis on how alliance formation and data management has played a role in the ranch's success.

After graduating from Oklahoma State University in 1990, and the Ranch Management program at Texas Christian University in 1991, Gallery returned home to the family ranching operation north of Bartlesville.

At that time, the operation was 100 percent stocker steers, 100 percent family owned and the Galleries were seasonal buyers. Their only real plan was to work hard, feed some of their cattle to finish, and sell some as feeders.

"At best, I would have to reflect on that period as

organized chaos," said Gallery. "We managed to do a good job with the cattle, but I had returned from TCU with a host of ideas about making changes in the established family operation. Working with my dad and brother proved to be a challenge. We all had different ideas, and the family dynamic played a role."

Gallery credits a 1999 visit from veterinarian, Dr. Shaun Sweiger, as the catalyst they needed for change. "Dr. Sweiger provided common ground where past, current and future operating plans could all be discussed and developed. Ten years have passed. Dr. Sweiger is still our consulting veterinarian, and the changes are too many to count.

"Information management is a key in our backgrounding operation," said Gallery. "We used to jot down notes on 3 X 5 index cards and hope to have time at the end of the season to sort through them. Now we track information and load it into our computer in a systematic way."

The information they track includes source, buyer, time of year, type of cattle, risk level, and death loss. All these variables are carried to the individual animal level and can be sorted and analyzed in multiple combinations.

Treatments are administered on individual animal screens based on tag color and number. Temperatures are recorded and dosage levels are calculated based on the animal's weight. "These variables play an important role in assigning the treatment protocol, monitoring pull rates, and evaluating treatment success rates," Gallery told the audience.

"Our ability to capture and manage information has led to many new opportunities in contract research. Dr. Sweiger has been instrumental in procuring research trials to conduct at our facility. Most of the cattle we handle are involved in research, whether that be contract basis or something in-house for curiosity's sake."

Managing risk was a variable that Gallery wanted to improve. He started backgrounding cattle on a custom basis. "I felt that this would provide a base cash flow and not put all of our efforts at risk," he said.

"We developed some key alliances out of our backgrounding operation through partnership arrangements with feedlots and order buyers. This allows us to spread our risk by being in the market every week at some level."

He went on to say that diversification was another key issue in the risk management area. In 2002, due to the drought in Colorado and Nebraska, they were able to assemble a commercial Angus cow herd.

Progress has been steady in Gallery's operation. Technology has allowed them to manage every aspect of their business more effectively.

The latest technology they have adopted is BVD PI (persistently infected) testing. Gallery Ranch is beginning their fifth year as a "PI free" facility. Every animal that arrives is tested. The data shows that weight gain, pull rates, and treatment responses are all improved by identifying and removing PI animals.

"Our biggest advantage is the timing of our first pulls," said Gallery. "We are able to tighten the window on our first pulls and virtually eliminate respiratory pulls after 18 to 20 days. This results in a tremendous reduction of labor requirements."

During the question and answer period following the presentation, Gallery brought up the importance of estate planning. The elder Gallery had no will. Theirs was a family ranch with two sons working different jobs in the operation and two sisters not involved. Gallery realized that if something happened to his father, without a will, the likelihood of lawsuits and hard feelings were almost inevitable.

"Fortunately, my father was willing to face this and he worked on putting a fair and equitable division down on paper. I cannot emphasize enough how important this is to both the working and personal relationships with family members."

He then reminded listeners, "We are all going to die eventually, there is no getting around that. If you care about your family and want to see your hard work continue to pay off for future generations, meet with a professional and put down everything in a legally binding document."

Composting large animal mortalities in Missouri

By Dr. Joseph Zulovich, Extension Agriculture Engineer

Success in the composting of poultry and swine carcasses has led to an interest in composting large animal mortalities like bovine and equine carcasses. Composting animal mortalities has been an approved method of dead animal disposal in Missouri for a number of years. A discussion covering all approved methods for handling animal mortalities in Missouri can be found in MU Guidesheet WQ216 titled "Dead Animal Disposal Laws in Missouri."

The guidesheet can be found at <http://extension.missouri.edu/explore/envqual/wq0216.htm> on the University of Missouri Extension website.

A number of MU Guidesheets have been published covering composting of poultry and swine mortalities. A foundation of information can be found in the MU Guidesheet WQ351 entitled "Composting Dead Swine" found at <http://extension.missouri.edu/explore/envqual/wq0351.htm> on the University of Missouri Extension website. This foundation of information based on the success of swine mortality composting can be used to provide guidance for large animal mortality composting.

While experience is somewhat limited, the following notes and observations can serve as a guide in

composting bovine and equine carcasses.

Review MU Guidesheet WQ351 for other general information on composting livestock carcasses. Additional information about composting large animal mortalities can be found at <http://www3.abe.iastate.edu/cattlecomposting/index.asp>, a webpage titled "Emergency Livestock Mortality Composting in Iowa" from Iowa State University. However, one needs to be aware that the rainfall runoff will need to be addressed (See point #4) if an uncovered windrow compost system is being considered in Missouri.

A Guide in Composting Bovine & Equine Carcasses

1. Locate composter on a suitable site as outlined in WQ351.
2. Perform composting in 3-sided bins or structures to confine material and facilitate cleanout. See composter details in WQ351.
3. Place carcasses in one layer only. Do not stack carcasses in composter.
4. Non-commercial composting of animal carcasses in Missouri is exempt from permit requirements if the composter is roofed and has an impermeable floor, usually constructed using concrete. Composting in an outside pile or windrow can be successful but runoff from the pile or windrows will need to be collected, stored and land applied. Undesired moisture additions are possible due to rainfall water penetrating into the composting pile.
5. Place carcasses on a layer of sawdust at least one foot thick in the composter. Puncture the abdominal cavity after placing carcass on sawdust layer and before covering.
6. Cover carcasses with at least one foot of sawdust and maintain at least one foot of sawdust between adjacent carcasses. Use sufficient sawdust to completely cover all parts of each carcass. Leave no parts of any carcass exposed. Plan to use a minimum of 200 cubic feet of sawdust per 1,000 pounds of carcass to be composted.
7. Add more sawdust as carcasses compost and as pile "settles" to ensure no exposure of carcass during composting process.
8. Allow up to one year of composting time for large carcasses without turning. Only the skeletal remains are found at the end of a composting period when composting process proceeded correctly.
9. Up to 50 percent of fresh sawdust requirements may be fulfilled by recycling finished compost.

Dairy Profit Seminars tour state

By Michelle Proctor, Senior Information Specialist

Missouri Dairy Profit Seminars took their annual show on the road, the week of February 23, traveling to Concordia, Mt. Vernon, Lebanon, Union, and Jackson. The five, all-day events were co-sponsored by the Missouri Dairy Association, the University of Missouri, and the MU Extension Commercial Agriculture Program. Producers paid only \$20 for the informative seminars, including lunch.

David R. Drennan, executive director of the Missouri Dairy Association served as moderator. Drennan gave an update on Missouri Senate Bill 254 and House Bill 658. If passed, the Show-Me Milk Stabilization Act will create a state income and corporate franchise tax credit for qualifying milk producers.

The bill will work as follows, each month the Director of Agriculture must report the production price of milk for Missouri based upon a three factor formula: Missouri milk price, production price and imported milk price. The tax credit will only be available when the announced production price for the state exceeds the average Federal Uniform or Mailbox Price for Missouri.

Mycotoxins

Nick Adams of Alltech spoke about the real costs of feed quality by educating listeners on the dangers of molds and mycotoxins. Mycotoxins are toxic metabolites produced by molds in stored grains, forages, silage, and in some pasture grasses. Most exert toxic effects by causing organ damage, poor feed conversion, reduced milk production, and fertility problems.

Adams focused his presentation on the mycotoxin *Penicillium* species. *Penicillium*, the most prevalent mycotoxin, can be observed as white to green colored patches in feed. They are produced when a suitable substrate such as feed is exposed to moisture greater than 14 percent, temperatures greater than 60 degrees Fahrenheit, oxygen greater than 0.5 percent and pH levels between four and eight.

Mycotoxicosis is difficult to diagnose. Symptoms are often non-specific such as, reduced feed consumption, reduced productivity, poor reproductive performance, digestive disorders, and nervous behavior.

"Observe general symptoms, rule out other causes," advised Adams. "Test feeds for common molds and mycotoxins. Remove or dilute contaminated feeds to ensure that antioxidant status is at a maximum." He also suggested inserting a binding agent such as Integral.

Optimized nutrition

MU assistant professor of dairy nutrition and research, Dr. Mathew R. Waldron, gave a talk on optimizing nutrition, titled "Dairy Diets: Knowing When to Spend Money to Make Money".

"Not all starch is created equal," explained Dr. Waldron. "It's not a one to one trade-off between wheat, barley, sorghum, oats, corn silage, bakery by-products, red dog flour, etc. They all contain starch, but all have different nutritional properties from corn grain."

Waldron compared traditional, high-starch diets (25-30% starch) with low-starch, highly fermentable diets (18-25% starch). He reminded producers, "As corn prices rise, so do wheat and other alternative feed prices. Many by-product prices fluctuate more than corn due to season, availability and other situations.

"Remember," cautioned Waldron, "by-products are not consistent in composition." Frequent changes in diet can put undue stress on the cow. "Sometimes, even if you've got to pay a lot, it may be worthwhile to go with the gold-standard. Too many by-product nutrient profiles are not as consistent as corn," he concluded.

Help getting into the business of dairying

Dr. Barry Steevens and Joe Horner, both University

of Missouri Extension Commercial Agriculture Program dairy focus team members, shared speaking responsibilities.

"In 2009, survival will depend on cash flow. The world will slaughter cows until the supply matches the reduced demand," said Dr. Steevens. "The milk check consists of up to 50 percent feed costs for the lactating herd, 20 percent for variable costs such as semen, teat dip and washing powder. The remaining 30 percent is divided between the producer and the banker. In short years, family labor doesn't get paid."

Horner informed attendees about state and federal programs to help get dairy producers started. He talked about the Family Farm Breeding Livestock Loan Program, the Animal Waste Treatment Loan Program, the Beginning Farmer Loan Program, Big Missouri Linked Deposit Program (MOBUCKS), Dairy Business Planning Grants, and Missouri Single-Purpose Animal Facilities Loan Guarantee, all administered by MASB-DA.

Horner also explained the FSA Beginning Farmer Loan for which the Farm Service Agency (FSA) provides direct and guaranteed loans to beginning farmers who are unable to obtain financing from commercial credit sources. The FSA loans include direct farm or operating loans up to \$300,000 and guaranteed farm or operating loans up to \$1,094,000.

Another method of entering the dairy business, the concept of sharemilking, offers a lower cost alternative. (Look for an article on sharemilking in Missouri in our Summer issue.)

Better reproduction performance

Dr. Scott Pock, University of Missouri Extension Commercial Agriculture Program veterinarian, introduced profit seminar participants to the Dairy Cattle Reproductive Manual. The manual is the hard copy of a new interactive tool for dairy producers developed by Dr. Pock, Joe Horner, dairy economist, and Ryan Millhollin, project manager, all members of the dairy focus team.

"Reproduction parameters have changed," said Pock. "In the past we looked at calving intervals of 12 to 13.5 months, conception rates of 30 to 40 percent, and 110 to 135 days open as guidelines. Now, we look at pregnancy rates which encompass the entire herd, not just those actually bred. We have to look at how many cows were eligible for breeding, using 21 day periods," Pock explained.

"Let's talk about a herd of 100 cows. We bred 33 cows. But remember, that means that 67 were not bred. With a heat detection rate of 33 percent (33/100), 12 became pregnant. By the old way of looking at this, you might think you had a 36 percent conception rate—but you don't. You have to include the 67 cows that were not bred in your calculations. Therefore, you end up with a 12 percent pregnancy rate."

If a producer can increase the pregnancy rate, it allows more opportunity to do voluntary culling and/or selling of excess breeding stock. The herd's low producers, chronic problem cows, P.I.s, high somatic cell count cows, and poor fertility animals, can be divested.

The Dairy Cattle Reproductive Manual begins by asking producers to think about "What is a cow's job?" The manual tells the producer to think of the cow as an employee. The producer provides her with housing, food and water, health benefits, and other needs. In return, she comes to the parlor two to three times per day to be milked.

Dr. Barry Steevens, dairy scientist, explains, "But she works for the producer more than just the 45 minutes a day in the parlor. Actually, the cow is working for you 24 hours a day, consuming feed and converting that feed into high quality milk"

The most productive time of the lactation is during peak milk. That period occurs sometime between 30 to 150 days in milk (DIM). The more time a cow spends during this part of her lactation during her lifetime, the more profit she will generate. The dairyman needs to maximize this time.

Therefore, to maximize profit, cows need to become pregnant on a regular basis. To accomplish getting a cow pregnant consistently, the reproductive program of a farm needs to be a high priority. It must also be relatively easy to implement. The Dairy Cattle Reproductive Manual will help producers find a practical way to improve their herd.

Producers can access the interactive Reproduction Economics Spreadsheet at the following website <http://agebb.missouri.edu/dairy/reproduction/>.

"If you do not have a software program that figures PR for you, you can use your Dairy Herd Improvement (DHI) report," said Dr. Pock. "It will give you the percentage of heat observed (equivalent to HDR). Multiply this number by your conception rate and you will get a crude estimate of PR."

Producers that are attaining success with their reproductive programs are now able to merchandise excess bred heifers, which is a great addition to the cash flow of the farm.

Raising quality heifers

Dr. Scott Nordstrom, veterinarian director, US Cattle Technical Services for Intervet/Schering Plough, spoke about bovine vaccines.

The first vaccine was developed in 1796 for small pox by Edward Jenner. Jenner took cells from cow pox lesions and injected animals prior to infection, allowing them to build up immunity. "The development of vaccines has allowed the confinement rearing of livestock. It has changed the industry. We can vaccinate for more than fifty diseases," said Dr. Nordstrom.

He explained that many factors affect the success of a vaccine, before it actually gets into the animal. "Timing, endotoxins, vaccine handling, disease antigens, genetics, stress, parasitism, nutrition, environment, and colostrum will all influence an animal's response to the vaccine."

Producers were cautioned to understand and use care when administering gram negative vaccines. "Endotoxins are derived from gram negative bacteria. They can improve the response to the vaccine but there is also danger of an endotoxin overload."

Common gram negative vaccines include leptospirosis, brucella, escherichia, fusobacterium, haemophilus, actinobacillus, pasteuria multocida, manheimia haemolytica, salmonella, sterpulina and campylobacter.

An endotoxin overload can put an animal into shock and cause inflammatory cells to release inflammatory mediators. For example, release of prostaglandins can cause abortion.

Nordstrom's endotoxin rules:

- Dairy cows are more susceptible
- The response, dose and type are related
- The smaller the animal, the smaller the dose needed
- The greater the stress, the greater the adverse event
- Cows vaccinated while fresh can lead to abortions
- Increased body temps equal increased reactions

"Never give dairy cattle more than two gram negative vaccines at one time," said Nordstrom. "Stressed calves should never be given gram negative vaccines at processing.

"Avoid gram negative vaccines on arrival or at weaning. Space additional vaccines at least one week apart to be sure endotoxins from previous vaccines have had a chance to clear the system," warned Nordstrom. "Timing is everything."

Don't be fooled by balmy spring

By Dr Tim Safranski, swine genetics and reproductive specialist



Evaporative cooling utilizes cool cells in farrowing rooms and breeding/gestation barns. Cool cells line the perimeter walls and are effective in keeping rooms 10-15° cooler than outside temperatures by pulling fresh air through wetted corrugated material. The inset shows a closer picture of the cool cells.

Cool Cells →



Mechanized ventilation systems are installed in swine facilities to provide adequate air movement to keep sows cool. Oftentimes, operations that use mechanical ventilation combine this method with cool cells to provide maximum comfort to the sows during hot months. Photos and captions provided by Amanda Williams, swine researcher

Temperatures for this past winter (Dec-Jan-Feb) were near normal. The three month average temperature was 32.5°F. February was markedly warmer than normal, averaging more than four degrees above normal. March was filled with beautiful balmy days that no one could complain about.

Based on the years I've lived in Missouri, however, I'd bet that we'll still have a summer with its fair share of heat and humidity. It's not too late to make sure we've addressed some of the manageable factors affiliated with seasonality of reproduction typically seen in domestic swine.

Scientists have investigated several temperature and lighting regimes. It is generally agreed that seasonality is associated with each of these, but other factors also come into play. We could talk about how the degree of the seasonal dip varies from year to year, but in severe years, it is typically bad from Canada to Mexico, arguing against an exclusive temperature dependence.

Looking to data from Scandinavian countries we can rule out exclusive photoperiod. Beyond that, however, for the summer of 2009 this discussion would be purely academic. Let's come back to what we can deal with now.

Photoperiod is an area on which an extensive amount of research has been conducted. For the breeding herd, however, the data only shows that we have a lot more work to do. We know that neither complete darkness nor constant light are ideal, so typically we suggest 10-14 hours should be the target.

Let's not forget the farrowing house. Research here is even less consistent and is complicated by heat

lamps, etc. The goal, however, is to be sure the sow consumes enough feed, and sometimes it is not cool enough for her to feel like eating, except overnight. Have you considered leaving enough light on for sows to get up and eat?

We also know that on Missouri farms temperatures get above the ideal range. Some pigs will show effects with temperatures at 80 degrees. The length of exposure, how cool it gets at night and for how long, and how many days, and other factors, all combine to complicate the picture. But, we should strive to provide the breeding herd with an environment below 80 degrees to the extent our facilities allow.

Outdoor pigs need to be provided shade. Ideally they will also be provided a means of wetting their skin. This may include use of misters or drippers or a water hole. Of course in a dirt lot situation all of these will result in the development of a wallow.

Most of the Missouri breeding herd is indoors. Management of the environment here is dependent on facilities. Some things to think about before it gets hot include: for all mechanically ventilated barns be sure that fans and fan shrouds are cleaned; efficiency of the fans at moving air can be dropped by 40% from dust buildup. Additionally, be sure to check fan drive belt tension as loose belts can lead to 50% or more reduction in fan air movement.

If the barn has cool cells, be sure the evaporative pads are in place and damage from mice is not extensive. Check for mineral buildup on the pads. Scale buildup prevents water from soaking into the cardboard, effectively eliminating the opportunity for evaporative cooling to occur.

If drippers are used turn on the system, make sure they all work and that there are no leaks. If watering in a trough, remember to adjust to summer frequencies. If using nipple waterers, check flow rates to be sure that the last nipple in the line has at least one quart per minute when nipples above stream are in use.

Regardless of the cooling system, each pig produces heat as a metabolic by-product. The ventilation system of the barn is designed to exhaust that heat and humidity.

Many farms are tempted to keep extra gilts or give sows an extra chance to conceive during the summer in order to meet breeding targets. But, it is critical not to do so at the expense of providing adequate space to each pig.

Now is also the time that strategic use of hormonal intervention is also considered. PG-600 is a commercially available product that causes growth and ovulation of follicles in sows with no ovarian activity. It has been shown to have positive impacts at shortening the wean-to-estrus interval during the summer slump and increasing the proportion of weaned sows showing estrus within a prescribed period postweaning.

There is research on the use of oxytocin or prostaglandins at the time of insemination. These are effective research tools, but to use them in the field requires work with the herd veterinarian.

So, the overall message is that we know it will be getting hot. We generally know what we need to do, but we just need to do it. Let's take care of the breeding herd and see whether we can make 2009 a summer with minimal measurable impacts of seasonality.

Update on new source standards under CAFO Rules

By Michelle Proctor, Senior Information Specialist

Dr. Joe Zulovich, University of Missouri Extension Commercial Agriculture Program swine focus team leader and structures engineer, gave an update on the most recent source standards under the new CAFO Rules. Dr. Zulovich spoke at the 2009 Missouri Pork Expo in Columbia.

"As of February, 2009, this is all we know," said Zulovich, "Current General Permits are valid until February 23, 2011. Current Site Specific Permits are valid until the expiration date included in the permit. Construction Permit Applications received by the DNR by February 26, 2009, will follow all existing rules that have been in place."

The applications must have been submitted by February 26; they need not have been approved. Rule changes began in March of 2009. New operations will require a nutrient management plan (MNP) based on both nitrogen and phosphorous. New operations construction applications will need to contact the Department of Natural Resources (DNR) for new source design criteria.

"It's probably not wise to begin open storage construction," said Zulovich. "Missouri has not as yet adopted the Environmental Protection Agency (EPA) rules that were released in December of 2008, but they will need to address the rule release. As it is, Missouri's Phase 1 rule making on new source design criteria, referenced from the EPA, may no longer be valid."

Permit Modification versus New Source classification was discussed. "Permit modification will be required for a change in a manure management system that does not result in a significant increase in manure load." Non significant changes will need to be clarified during rule making. Zulovich believes that current existing design criteria will continue.

"An increased manure load on a given site, usually caused by an increase in animal inventory will require a New Source classification," he warned. Significant changes will need to be clarified during rule making and new design criteria must be followed.

Animal welfare regulations now require 18 to 20 square feet per head. "In the future? Thirty-six square

feet could be the standard," speculated Zulovich. "If you have to add new buildings to meet new standards though, you are not a new source as your number of sows and manure output remains the same."

The New Source Design Standard based on the USEPA December 2008 Rule Release requires that any new swine, poultry or veal operation shall not discharge under any circumstances.

"The simple design answer," said Zulovich, "is that all new manure storages must be covered, should include no rainfall runoff and have a 365 day minimum storage capability. They should be able to spread at least during both spring and fall periods."

More complex designs are being evaluated. Zulovich also warned that anaerobic lagoons must be pumped often.

Dr. Zulovich can be contacted at zulovichj@missouri.edu or 573 882-0868 for the most recent developments with the New Source Standards under the new CAFO Rules.

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2009 Dates

April

- 11 Native Plant Sale**
Bradford Research & Extension Center, Columbia
- 13-14 Nutrient Management Planning Course, Part 2,**
Calculation/Field Session or
- 15-17 Nutrient Management Planning Course, Part 2,**
Calculation/Field Session

May

- 2 Show-Me Select Replacement Heifer Sale, Fruitland**
- 4 Pork Profit Seminar, Nevada**
- 5 Pork Profit Seminar, Marshall**
- 6 Pork Profit Seminar, Mexico**
- 12-14 Southwest Center Grazing School, Mt. Vernon**
- 15 Show-Me Select Replacement Heifer Sale, Carthage**
- 27-29 MO 4-H Dairy Cow Camp, Springfield**

June

- 1-5 Agricultural Lenders School, Columbia**
- 8-10 MO Youth Pork Institute**
- 18 Native Plant/Quail Field Day**
Bradford Research & Extension Center, Columbia

July

- 8-10 MO Dairy Grazing Conference, Joplin**
- 28-31 Crop Injury & Diagnostic Clinic**
Bradford Research & Extension Center, Columbia

2009 Agriculture Lenders School

"Learning to identify and make quality agricultural loans today and in the future will be the focus of the 2009 Agricultural Lenders School, to be held in Columbia the week of June 1 through June 5," according to Joe Horner, University of Missouri Extension Commercial Agriculture Program dairy and beef economist.

"Professionals in the agricultural lending industry from Missouri, Illinois, Arkansas, and throughout the Midwest who make loans to farmers and agribusinesses are the intended audience for the intensive, five-day school," says Horner.

Nationally recognized experts will serve as faculty in a hands-on, practical approach to learn the business of making agricultural loans.

Dr. Freddie Barnard, an expert in agricultural finance and farm management, a faculty member at Purdue University, will lead the training in analyzing real-life farm financial statements.

Lenders who previously attended

the school agreed that the school delivered what it promised.

Curtis Fischer, with FCS Financial in Jefferson City, Missouri said, "The Ag Lenders School is a well-rounded experience. I learned from class-room interaction, hands-on exercises, and opportunities to interact with other lenders that have helped in my job activities."

The fee for the five-day event is \$1,250 per person and covers the program, training materials, and meal costs. Registration deadline is April 24th. Starting on Monday morning and finishing on Friday at noon, the program is fast moving and engaging.

Online registration and other information about the Agricultural Lenders School can be found on the web at: <http://agebb.missouri.edu/commag/lenderschool/index.htm>.

Registration information is also available from the MU Conference Office at (573) 882-4349 and by email at muconf6@missouri.edu.