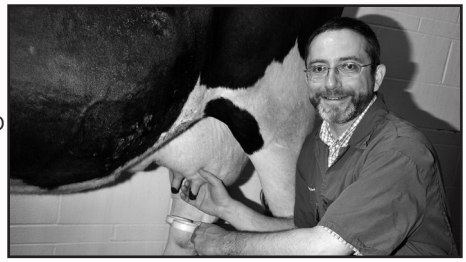
FOOD ANIMAL NEWS

Winter 2013, Volume Five, Issue One

College of Veterinary Medicine
University of Missouri

What's New in Food Animal Medicine at Mizzou?



John Middleton — head, Food Animal Medicine and Surgery

The past year has seen yet more changes in the food animal section at MU. In October, the second large class size entered the clinical curriculum. Last year we reported on changes to the food animal rotation to accommodate this expansion. As reported, the clinical block now includes two weeks individual animal training, two weeks field service, and two weeks of regulatory/public health/production medicine. In an effort to further enhance the program we have made some additional revisions to the regulatory medicine portion of the block to include herd-based production medicine, field trips to a slaughter plant, a vaccine manufacturer, Mexico sale barn, and Jefferson City. In addition we are developing the College's Middlebush Farm cattle herd into a demonstration cow-calf operation to teach students about cow-calf production in Missouri.

Food animal caseload and student exposure to routine food animal health management continues to be enhanced through our relationship with University beef and dairy farms. Students are involved in routine processing of cattle, sick animal assessment and care, and management of herd health protocols and record-keeping. Drs. Craig Payne and Scott Poock, Veterinary Extension, continue to work with our students as part of the regulatory rotation teaching students about beef and dairy production, respectively.

There have been additional changes in personnel over the last year. In September 2012, we hired Dr. Brian Vander Ley. Vander Ley has a DVM and PhD from Iowa State University and joins our field service faculty as a clinical instructor.He has a wealth of knowledge about beef cattle and beef cattle practice and will begin clinical duties in January 2013. Dr. Beth Young, swine Extension veterinarian, has left MU and is moving to Sweden. We thank her for her contributions to the food animal section teaching our students swine medicine and production.

In the next month we will be setting up an e-mail list-serve for food animal practitioners so that we can distribute our annual newsletter and allow discussion of emerging issues between our faculty and food animal practitioners in Missouri.

Finally, we wish everyone a happy, healthful and productive 2013!

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Spotlight: Food Animal Research at MU in 2012

The food animal faculty continues to be actively engaged in basic and applied research that has direct relevance to veterinary practice and food animal producers. The research team comprises faculty, staff, graduate students, and undergraduate/professional students. While our primary focus is food animal diseases, we have collaborations with faculty in small animal medicine, equine medicine, and human medicine. Current areas of research include bovine mastitis, bovine respiratory disease, Johne's disease, Corynebacterium pseudotuberculosis, and passive immunity. Research on these subjects is funded by the United States Department of Agriculture, industry, and the College of Veterinary Medicine.

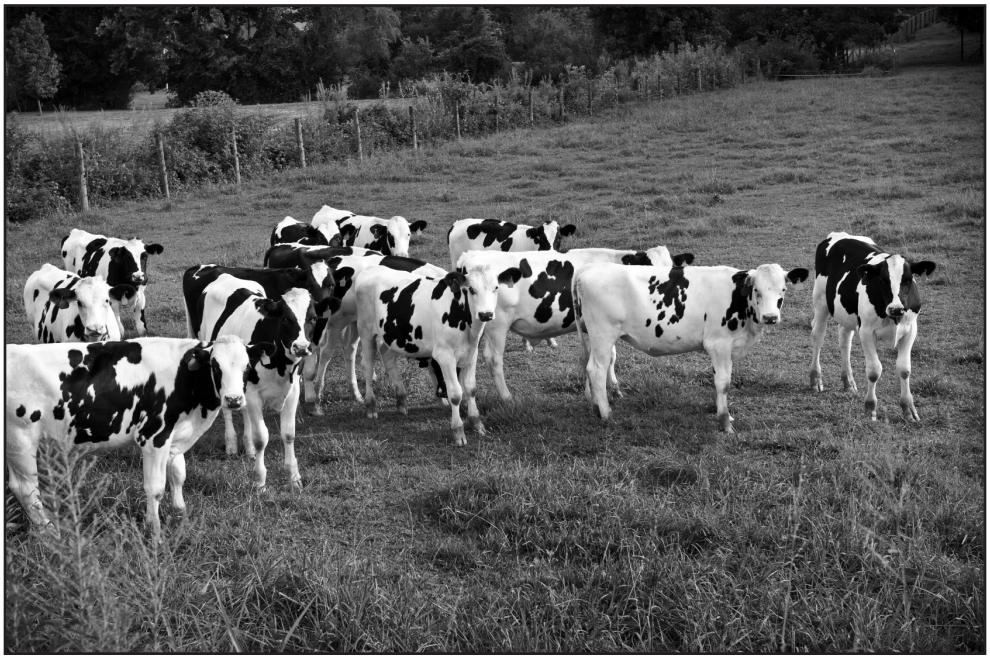
Dr. John Middleton's group continues to work on bovine mastitis. Kenton Hoernig (MS candidate) is evaluating lysostaphin as a therapeutic approach to Staphylococcus aureus mastitis. Dr. Pamela Fry (PhD candidate) is using genomic and proteomic approaches to enhance our understanding of staphylococcal mastitis, and recently presented her preliminary findings at the annual Mastitis Research Workers Conference in Chicago, IL (Nov. 6-8, 2012). Hoernig's and Fry's work will be presented at the National Mastitis Council Annual meeting in San Diego, Calif., in January 2013. Our 2012 summer research scholar Andrea Neumann studied cow standing and lying behavior using accelerometers to help us understand the influence of induced S. aureus mastitis on cow behavior as a measure of cow well-being.

Dr. Patrick Pithua continues to be actively involved in research evaluating the efficacy of colostrum replacement products in ensuring calf health. Current work is being conducted at the MU Foremost dairy. Pithua is also studying Johne's disease in meat goats and has recently published a paper that predicts that more than 50 percent of boar goat herds in Missouri may have at least one goat seropositive for Johne's disease.

Dr. Meera Heller along with Dr. Ignacio Idoate (MS candidate) continues to evaluate cellular immunity in calves following consumption of maternal colostrum, colostrum replacer, or no colostrum. Heller also has interest in Rhodococcus equi infections in horses and Corynebacterium pseudotuberculosis infections in sheep, goats, and horses.

Finally, Dr. Brian Vander Ley is embarking on a study to evaluate biomarkers for accurately diagnosing bovine respiratory disease complex in calves with the ultimate goal of developing a point-of-service test to fine tune treatment decisions in cattle with respiratory disease.

For more information on any of the research topics, contact us at 573-882-6857.



Food Supply Faculty and House Officer Updates

Faculty	Title	Clinical/Research Interests
John Middleton, DVM, PhD, DACVIM	Associate Professor, Section Head, Assistant Director – Agricultural Experiment Station	Internal medicine, general medicine and surgery / mastitis, molecular epidemiology of bacterial pathogens
Meera Heller, DVM, PhD, DACVIM	Assistant Professor	Internal medicine, general medicine and surgery/ immunology, bacterial disease
Dusty Nagy, DVM, PhD, DACVIM	Assistant Teaching Professor	Internal medicine, general medicine and surgery, field service
Brian Vander Ley, DVM, PhD	Clinical Instructor	Field service, general medicine and surgery/bovine respiratory disease
Loren Schultz, DVM, MS, DACVPM	Associate Teaching Professor	Public health, epidemiology
Patrick Pithua, BVM, MSc, PhD	Assistant Professor	Public health, epidemiology/passive immunity, Johne's disease
House Officers		
Pamela Fry, DVM, MS	Resident (Internal Medicine)	Medicine and surgery/molecular epidemiology of bacterial pathogens
Ignacio Idoate, DVM	Resident (Internal Medicine)	Medicine and surgery/passive immunity
Josh Schaeffer, DVM	Resident (Production Medicine)	Production medicine, public health
Graduate Student		
Kenton Hoernig, BS	MS candidate	Bovine mastitis
Staff		
Julie Holle, RVT	Senior Veterinary Technician	Medicine and surgery
Karen Siegler	Service Representative	
Becky Elias	Office Supervisor	
Bryan McGinty	Food Animal Caretaker	

New Faces

Brian Vander Ley, DVM, PhD

Bovine Viral Diarrhea Virus Control Basics

By Brian Vander Ley, DVM, PhD

While anytime of the year is a good time to talk about Bovine Viral Diarrhea Virus control in cattle herds, this time of year is a great time to consider implementing BVDV control in your clients' herds. Fall calving is wrapping up, breeding is well under way, and we are starting to look forward to spring calving. Each of these events offers opportunities to implement BVDV control in a herd.

Before launching into the particulars of control programs, it is important to illustrate why BVDV is an important disease. BVDV was first described in the early 1900s as a disease causing fatal mucosal disease (MD) in cattle. Cattle with this condition would develop oral ulcers, diarrhea, and would die quickly. As diagnostic capabilities improved, researchers realized that BVDV did a lot more than just cause diarrhea and MD. We now know that BVDV causes early embryonic death and abortion, fetal malformations, immune system dysfunction, and bleeding diseases in cattle. We also know that BVDV infects many other types of animals, including whitetail deer.

BVDV causes two distinct types of infections. The first type is known as an acute or transient infection. As the name implies, cattle that develop acute infections come into contact with BVDV, are infected, and then mount an immune response that removes the virus from their bodies. During this type of disease, cattle may have a range of clinical signs ranging from inapparent to severe bleeding disorders. The second type of infection is known as a persistent infection. Persistent infections develop when calves are infected in utero during the first trimester of gestation. During the first trimester of gestation, each calf's immune system is learning not to attack "self." When BVDV is present during this period of development, it is also recognized as "self" and is not cleared from the calf. These calves often survive gestation, appear normal at birth, and shed large amounts of BVDV for their entire life. It is important to realize that PI females will always give birth to PI calves, but PI calves do not necessarily have a PI dam.

While cattle with acute infections can spread BVDV to other susceptible cattle, persistently infected cattle (PIs) present the biggest threat to animal health and productivity. For this reason, control programs usually center on removing PIs, decreasing risk of exposure in pregnant cattle, and preparing all animals for exposure through vaccination.

PI identification involves collecting a skin sample, usually an ear notch, and submitting it to a laboratory for testing. Exactly how the samples are submitted depends on which test your laboratory is running, so make sure you collect the sample correctly for the test that will be run. Producers that are implementing BVDV testing for the first time or have not tested in a long time should collect ear notches from all calves born in a calving season, all cows that do not have calves, all bulls, and all replacement females. By sampling these animals, a producer can avoid testing almost half the animals on their operation because a negative test result for a calf automatically means that the dam of that calf is also negative. If a calf tests positive, it needs to be retested after at least three weeks to confirm its PI status and its dam needs to be tested as well. Once an animal tests negative as a PI, it is PI negative for life.

The second leg of BVDV control is aimed at minimizing the risk of exposure through biosecurity measures. There are multitudes of ways to implement biosecurity measures that can have a meaningful impact. Examples include quarantine and testing of new arrivals, including bulls, prior to putting them in with the herd, trying to limit fence line contact with neighboring cattle, and washing out your trailer after bringing cattle to the sale barn. If you are interested in assessing your risk and developing a biosecurity plan, please contact us. We would be happy to help in any way possible.

The third leg of BVDV control is vaccination. By immunizing cattle against BVDV, you can reduce the severity of disease and protect most fetuses from gestational exposure. While killed virus vaccines have some value, maximal protection can be achieved through the use of modified live virus vaccines. There are two very important points to keep in mind when implementing vaccination, especially with modified live vaccines. First, it is critical to use vaccines correctly. Modified live vaccines have the potential to cause abortions when used inappropriately in pregnant cows. If they are mishandled, they

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Epizootic Hemorrhagic Disease Overlooked

By Robert Sager, DVM, MS, DABVP

Epizootic Hemorrhagic Disease, a significant viral disease affecting wild and domestic ruminants has been recognized since 1955 in the United States. Prevalence of this disease (EHD) is high in cattle but rarely produces clinical signs so the disease is often overlooked as a cattle disease. Most commonly recognized as a major problem in wildlife, especially white-tailed deer, this disease produces cyclic enzootic mortality in deer populations. Sheep can be clinically infected but do not show clinical signs, whereas pigs and goats are not infected (Radostits, et al., 2005).

Caused by a virus (EHDV) is a serogroup of Orbivirus, which is closely related to the common bluetongue virus, has a similar pathogenesis to bluetongue virus causing extensive vascular injury and tissue necrosis. The virus closely follows similar geographical patterns to bluetongue because of vector transmission by Culicoides, gnats, and some mosquitoes whose distribution is directly affected by environmental conditions. Clinical signs of fever, lameness, oral mucosa swelling, edema, and reddening and necrotic ulceration of the dental pad with muzzle skin sloughing and cracking are more common clinical signs. Less often reddening and hyperemia of the udder and teats are evident.

Clinical signs in cattle are most common during late summer and early fall (August to October) in the United States. There are two serotypes, EHDV-1 and EHDV-2, with differences in severity due to geographical differences (OIE, 2006). EHDV-2 has been reported to be more severe in some areas of the United States resulting in abortions and stillbirths. The disease can be more severe in other parts of the world such as Australia, Africa and Japan where outbreaks resulting in morbidity of 90 percent and mortality of 60 percent or more are reported. Necropsy signs are very similar to bluetongue with hemorrhage, edema of the mucosa, ulcerative stomatitis, aspiration pneumonia, and necrosis due to severe vascular injury and resulting tissue necrosis.

Virus isolation, c-ELISA, or nucleic acid identification is the gold standard as AGID will detect antibody but also will detect cross-reactive antibodies to bluetongue (Afshar, et al, 1997).

Whereas EHD is not a major disease in cattle in this area, it should be considered as a differential when clinical signs are evident and should be considered during late summer-early fall abortions and stillbirths in cattle herds. Ectoparasite pour-on control, with sprays to reduce flies, mosquitoes, culicoides, and gnat incidence, can be used to minimize infection of EHD during high risk times of the year.

BVDV, continued

will not work at all. Also remember that most vaccines have a 21-day slaughter withdrawal, so be sure to read the label and do not vaccinate cattle that may need to be sold soon (for example, open cows at pregnancy exam time). Second, remember that vaccines are like a wall of protection. Usually, the wall is thick enough and high enough to keep out harmful invaders like BVDV; however, some cows do not respond as well and some strains of BVDV are very harmful. In these cases, vaccination may not completely protect your animals from infection.

By implementing all three legs of BVDV control, you will be able to prevent most BVDV related problems in a herd. While some infections may still occur, good biosecurity will keep these to a minimum, good vaccination will prepare cattle to handle them, and testing will quickly eliminate any PIs that may result from these infections. If you have questions about BVDV or you want some assistance setting up a BVDV control program, please don't hesitate to contact us. We would be pleased to assist you.

Urolithiasis in Small Ruminants

By Josh Schaeffer, DVM

The blocked male small ruminant has the potential to be a nightmare for owners and practicing veterinarians, alike. Instituting a thorough treatment plan with outcome goals will eliminate many of the fears associated with handling the case. Several things need to be considered when developing a treatment plan for a sheep or goat with urolithiasis. First, a correct diagnosis must be confirmed and any complicating factors (bladder rupture, urethral rupture, severe azotemia, etc.) need to be ruled in/out. Next, it must be determined if medical management alone is possible, or if surgical intervention is needed. Finally, realistic goals and expectations, based on previous experiences and published literature, must be established.

Diagnosis and Complicating Factors

Physical exam and clinical presentation are often all that is required to presumptively diagnose urolithiasis. Most cases present with signs of colic: vocalization, painful abdomen, bruxism, tail-flagging, and possible forceful abdominal contractions. Examination of the prepuce may reveal crystals attached to the hair. Dribbling of urine may be present if the blockage is not complete. Patients are often tachycardic and tachypnic. On rectal palpation, urethral pulsations are often noted. An enlarged bladder may be palpable upon abdominal palpation, but care should be taken not to rupture the bladder. Abdominal ultrasound will aid in determining the integrity of the bladder and the presence of abdominal fluid. If increased abdominal fluid is present, an aseptic abdominocentesis should be performed. Testing the abdominal fluid with and azo stick is a quick way to determine if a uroabdomen is likely. If there is swelling along the prepuce or on the ventral midline, a urethral rupture is likely.

The distal urethra should be examined before a treatment plan is established. This is often accomplished by mildly sedating the animals. Acepromazine or diazepam is preferred, as these agents relax the smooth muscle of the urethra and do not have a diuretic effect on the kidneys. Once sedated,

the animal is rumped and the penis is extruded. The urethral process may appear inflamed or necrotic depending on the severity and acuteness of the disease. Amputation of the urethral process may restore urine flow. If no further treatment is implemented, animals often reblock following the amputation.

Laboratory work is often needed to determine an appropriate course of action. A serum chemistry profile will reveal the severity of the azotemia and electrolyte abnormalities. If a sample is obtainable, a urinalysis will hopefully show the crystal and stone type(s) present so that appropriate corrective and preventative measures can be taken.

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Medical Management

Medical therapy is required for all cases of urolithiasis, but is only used as a stand alone therapy if urine flow can be established. Intravenous fluid therapy should be initiated to provide diuresis and to correct electrolyte abnormalities. The fluid flow rate should exceed twice maintenance fluid rate (maintenance is 60 ml/kg/day). A slower rate may be warranted early in the management of the case until it can be assured that the patient does not have severely impaired renal function. NSAIDs, such as flunixin meglumine, may be administered to relieve inflammation, but again caution is necessitated as NSAIDs alter renal blood flow and may perpetuate further renal damage. Hence, having an exit for urine before excessively hydrating is important and perfusing the kidneys is important before instituting NSAID therapy. Antibiotic therapy for control of secondary infections is often implemented. Antibiotic selection should be based on renal excretion and a low potential for nephrotoxicity, such as procaine penicillin G. Urine acidifiers, such as ammonium chloride, are beneficial in the management of struvites, as these stones dissolve in an acidic environment. Remember to keep in mind that regardless of the owner's purpose for the animal, all small ruminants are food animals and fall under the guidelines outlined in the Animal Medicinal Drug Use Clarification Act.

Surgical Intervention

Surgical treatment is required if urine flow cannot be established by other means or if a bladder or urethral rupture is suspected. A tube cystotomy or a perineal urethrostomy are the two most common surgical procedures performed. In general, a tube cystotomy is a more technically difficult procedure as it does involve opening the abdomen. In the case of a bladder rupture, this procedure allows the clinician to evaluate the integrity of the bladder and lavage the abdomen. The percutaneous catheter should be left in and managed for 10 to 14 days. Occasionally, urine flow through the urethra is not regained and an additional procedure is required. The perineal urethrostomy is a simpler and cheaper surgical

alternative, and is the only option available if the urethra is ruptured. Because the urethra is transected in the procedure, a perineal urethrostomy should not be performed in breeding animals. Both of these procedures are relatively common and are described in many large animal surgical texts.

Prognosis and Expectations

As with many disease processes, if urolithiasis is recognized early, the prognosis for long-term survival is increased. The more complicating factors that are present on patient presentation, the poorer the prognosis. Owners should not be guaranteed of any outcome. Owners should also be alerted to the fact that once a small ruminant blocks, it is prone to blocking again in the future. Clients should be educated on preventative measures, including diet, water intake, andurine acidifiers.

Referral

If the case is to be referred to a referral clinic, the primary veterinarian should contact the referral clinic prior to the client leaving the primary clinic. By doing this, a presumptive cost estimate can be made for the client before traveling. Furthermore, the primary veterinarian may be able to better provide an outline of the events that will transpire at the referral clinic to the client. If the animal is to be transported over an increased distance and has an enlarged bladder, percutaneous drainage of the bladder may prevent rupture.

Forage/Grain Toxicant Update from the VMDL

By Tim Evans, DVM, MS, PhD, DACT, DABVT

Nitrate Accumulation in Plants

Nitrate accumulation is still a concern in species of Sorghum, as well as drought-damaged corn (particularly in cornstalks), and millet. While nitrate concentrations will generally decrease up to 25 to 50percen with ensiling, elevated nitrate concentrations will be maintained in hay. In fact, nitrate concentrations might even increase in bottom hay bales, because of leaching of water-soluble nitrates from upper bales of hay which are rained upon.

Potential Adverse Health Effects: Nitrate in forage stalks and stems →nitrate in rumen →nitrite in rumen →nitrite in blood. Nitrite in the blood converts hemoglobin to methemoglobin, which doesn't bind oxygen. Methemoglobin formation is associated with "chocolate brown" blood, lethargy, and exercise intolerance, as well as, potentially, abortion and sudden death in cattle and other susceptible ruminants.

Quantitative Nitrate Analyses: When nitrate concentrations are unknown and/or liable to be elevated, the VMDL recommends that samples be submitted for quantitative nitrate analyses. These analyses currently cost $23/sample, and results are usually available within four days. Submit in quart- to gallon-sized containers.

Interpretation of the Results: Interpretation of the results of quantitative nitrate testing is best done in cooperation with extension personnel and veterinarians. Nitrate concentrations equal to or greater than 1 percent (10,000 ppm) on a dry-matter basis have been associated with acute death of cattle from nitrate/nitrite poisoning. To prevent nitrate-associated abortions, pregnant cattle should not be fed forage containing greater than 0.5 percent (5,000 ppm) nitrates, with total dietary concentrations <0.25 percent (2,500 ppm) of nitrates.

Management: When suitable forage is scarce, especially as winter weather approaches, it is important for producers to have their "bred" cows checked by their veterinarians for pregnancy, and culling should be considered for open cows. Depending on the circumstances, it might also be worthwhile to have bulls evaluated for adequate semen quality. Dilution of high-nitrate-containing forages with low-nitrate containing forages can decrease the overall nitrate concentration in feedstuffs, and cattle being supplemented with grain seem to be less susceptible to nitrate/nitrite poisoning. There are products containing "probiotics", which reportedly decrease nitrite production in the rumen. The utility of such products for a given management system should be assessed in consultation with a veterinarian.

How Much Nitrate is Too Much for Ruminants?

NO_3^- ppm	*Category*	*Recommendation*
0 to 2,500	Safe	Forage is generally safe to feed to all classes of livestock.
2,500 to 5,000	Caution	Forage with this nitrate (NO_3^-) content can cause a problem with pregnant and young animals. Do not feed forage with nitrate levels this high in combination with non-protein nitrogen supplments, and limit forage with NO_3 levels this high to to one-half of total ration,
5,000 to 15,000	Danger, Toxic	Limit forage with this NO_3^- level to one-fourth of total ration. Supplement forage of this type with energy, minerals and vitamin A.
More than 15,000	Extremely Toxic	Forage with this NO_3^- level or higher is toxic and should not be fed unless absolutely necessary. If forage with this NO_3^- concentration must be fed, it should be mixed with other feed and make up no more than 15 percent of the total ration.

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Aflatoxins in Corn

Drought-damaged corn is highly susceptible to infection by Aspergillus fungi, and storage of infected high-moisture corn at high temperatures facilitates the production of fungal toxins (mycotoxins) called aflatoxins, which can be passed into the milk of exposed dairy cattle at dietary concentrations greater than 20 ppb (parts per billion) or 0.02 ppm.

Potential Adverse Health Effects of Aflatoxins: High dietary concentrations of aflatoxins can also cause serious illness, such as liver disease in humans and animals, including cattle, sheep, goats, pigs, horses, birds, dogs, and cats. Recently submitted corn samples have contained elevated aflatoxin B1 concentrations (many exceeding 100 ppb), which, under certain circumstances, can potentially be associated with clinical disease or, perhaps more commonly, less than optimal growth, rate of gain, and, even, immunity and fertility.

Sampling for Aflatoxin Analyses: Since aflatoxins can be produced in "pockets" of moldy corn, obtaining a representative sample for aflatoxin analysis is critical. Representative sampling can best be accomplished with input from MU Extension personnel, but might consist of pooled samples of ears of corn or samples taken from a storage bin, truck, silo, or pit using a probe or moving stream collection techniques.

Analyses for Aflatoxin: Various commercially available ELISA kits and test strips can be used for rapid field determinations of whether corn samples contain any aflatoxins or not. The VMDL recommends that representative samples of corn or corn-containing silages, or mixed feeds, especially those which have tested positive for aflatoxins using ELISA tests, be submitted to the VMDL for quantitative aflatoxin (aflatoxin B1, B2, G1, G2) analyses, using high performance liquid chromatography (HPLC). Analyses currently cost $42.25/sample, and results are usually available within 5 working days. Submit in quart- up to gallon- sized containers (especially if also testing silage for nitrate).

Interpretation of the Results: Animals vary in their susceptibility to the adverse effects of aflatoxins, and accurate interpretation of analytical results should take into account animal species, age, and use, as well as published FDA action levels. Aflatoxin B1 concentrations in feedstuffs equal to or greater than 20 ppb exceed FDA action levels for immature poultry, "stressed" animals, and some animal species, including dogs and cats, and can be associated with violative aflatoxin residues in the milk of exposed dairy cows.

Management: Dilution of aflatoxin-containing feedstuffs in the ration and ensiling these feedstuffs are ways by which dietary concentrations of aflatoxins can be reduced. Aflatoxin concentrations should be rechecked in mixed grain rations or ensiled forages prior to feeding. There are also "binders" which can, depending on the product, effectively decrease aflatoxin absorption, but use of such products should be discussed with a veterinarian and be based on clearly demonstrated aflatoxin binding efficacy in live animals. To compensate for discrepancies in sampling techniques, it

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is advisable to aim for total aflatoxin concentrations no more than one-half of the current stated FDA action levels (see below) or, for example, <10 ppb (0.01 ppm) in lactating dairy cattle rations and diets fed to immature poultry or "stressed" animals, and <50 ppb (0.05 ppm) total aflatoxins in the diets being fed to breeding animals. This year, high quality, grain-containing rations, just like forages suitable for livestock consumption, might be less available and more expensive than in previous years. In response to this possibility, producers should enlist the services of their veterinarians and have their "bred" cows checked for pregnancy, and their bulls should be semen tested. Open cows and bulls with unsatisfactory semen quality should be considered for culling. In addition, rations containing drought-damaged forages and corn and, possibly, aflatoxins will likely have less than optimal nutritional value. Under these circumstances, producers need to be proactive. Livestock owners should maximize good husbandry practices by providing appropriate shelter and potable water, evaluating rations for adequate energy and protein content, monitoring animal body condition scores and/or rate of gain, following veterinarian-recommended vaccination and deworming protocols, and considering supplementation with trace elements and/or vitamins, as indicated.

FDA Action Levels* for Aflatoxin-Contaminated Corn/Corn-Containing Feedstuffs

Action Level	*End Use of Grain/Feed*
20 ppb	Animal feed/feed ingredients intended for dairy, immature poultry, stressed animals
20 ppb	Human consumption
100 ppd	Grain intended for breeding cattle, swine, and mature poultry
200 ppb	Grain intended for finishing swine (>100 pounds)
300 ppb	Grain intended for finishing beef cattle

**Concentrations of Aflatoxins NOT TO BE EXCEEDED in order to avoid possible regulatory intervention*

Source: FDA Regulatory Guidance for Toxins and Contaminants, www.ngfa.org/files/misc/ Guidance_for_Toxins.pdf.

Prepared by: T.J. Evans, DVM, G.E. Rottinghaus, PhD, R.L. Kallenbach, PhD, B.R. Landers, MS

VMDL: http://vmdl.missouri.edu/

MU Extension: http://extension.missouri.edu/index.aspx

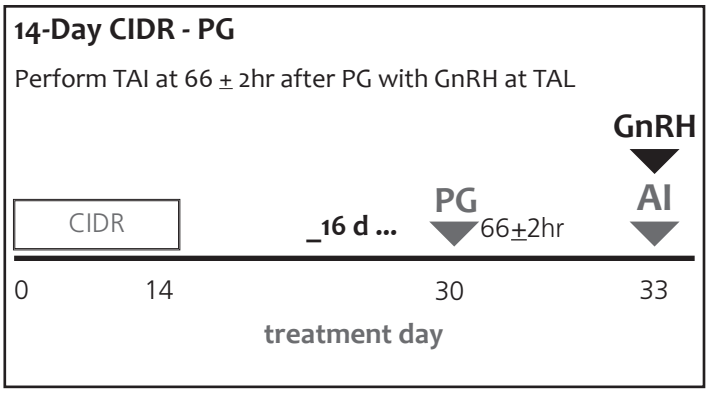
Show Me Synch Background and Results

By Scott Poock, DVM, DABVP

The Show Me Synch (14-Day CIDR-PG) protocol is a 33-day program. The protocol involves placing a CIDR in a heifer for 14 days followed by an injection of prostaglandin (Estroplan, Estrumate, or Lutalyse) 16 days after removal of the CIDR at 2 p.m. Sixty-six hours (8 a.m.) the heifers will be fixed–time inseminated with an injection of GnRH. This protocol was developed at the University of Missouri. Dr. Dave Patterson, graduate students, and Genex reps have been field testing this protocol in beef heifers and cows. Based on research recently conducted in Missouri, the goal of implementing a protocol that incorporates pre-breeding health requirements and synchronization can now be accomplished with the Show Me Synch protocol.

Veterinarians and producers are beginning to view the Show Me Synch protocol as a starting point to implement various other heifer management procedures well ahead of breeding time. These include: pre-breeding vaccinations, pelvic measurements, reproductive tract scores, deworming, etc., all of which may be performed during the heifers' first trip through the chute and coincide with date and time CIDRs are inserted. Current recommendations for effective use of vaccines indicate that some pre-breeding vaccinations may result in negative effects on conception rates when administered immediately prior to the breeding season. Vaccination with a Modified Live Vaccine (MLV), at the CIDR insert (33 days before breeding), affords producers and their veterinarians the most effective utilization of these vaccines without deleterious effects on conception.

Given that background, we have been interested in the use of Show Me Synch in dairy heifers. The first farm to incorporate the protocol was the University of Missouri's Foremost Dairy. They bred several groups of heifers in December of 2008 that had been synchronized with the Show Me Synch protocol and bred on estrus with Gender Selected Semen. They averaged better than 50 percent conception, synchrony



of the estrus was tight, and > 95 percent of heifers responded. This led to utilizing the protocol in two commercial dairies (one conventional and one grazing). The conventional dairy heifers were split into two groups, one on Show Me Synch and the other only received an injection of prostaglandin. The Show Me Synch program yielded ~ 30 percent more pregnancies than using prostaglandin only. On the grazing dairy the pregnancy rate to AI was 60 percent (48 out of 80 heifers were pregnant to AI).

With these results, we decided to continue testing the protocol. Foremost Dairy has been using the protocol and time artificial inseminating (TAI) with Gender Selected Semen since December 2009. They were reluctant to use TAI with the Gender Selected semen, but as of August 2010, their conception rate has been 45.5 percent (86 pregnant out of 189 breedings).

Being encouraged with these results, Genex and the University of Missouri developed a trial with 240 Holstein heifers. All the heifers were weighed, aged, pelvic measured, reproductive tract scored, vaccinated, and dewormed at the CIDR insert. Based on the information gathered, they were randomly assigned to one of two groups. The first group

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Show Me Synch, continued

was TAI with Gender Selected Semen and the second group with conventional semen. Only one bull was used for the AI. A single day's collection from the bull was divided into Gender Selected and conventional processing. Finally, only one technician inseminated all the heifers. Likewise, recording of the timing of prostaglandin injection and breeding was done.

The heifers were bred on June 7, 2010, and ultrasounded on Aug. 9, 2010. The heifers bred with conventional semen had a 69 percent conception rate and Gender Selected was 37 percent. Interestingly, the heifers bred to conventional semen had basically the same conception rate whether they had expressed estrus or not (using Estrotect patches). However, for the Gender Selected group, for those that showed estrus the conception rate was 46 percent versus 24 percent for those that did not show heat.

We also repeated this protocol on a grazing dairy. We used the University of Missouri's grazing dairy at the Southwest Center in Mount Vernon. There were 49 crossbred heifers (Holstein and Jersey crosses) in 2010 and 34 heifers in 2011. We reproductive tract scored, vaccinated, and dewormed at the CIDR insert. Conventional semen from New Zealand and American bulls was used to breed the heifers. The heifers were bred in early May both years and ultrasounded the end of July. Thirty-six out of the 49 heifers became pregnant to TAI (73.4 percent) in 2010 and 24 out of the 34 heifers were pregnant in 2011 to TAI (70.5 percent).

Similarly, a commercial grazing dairy bred 54 heifers to both conventional or gender selected semen with TAI. The heifers bred to conventional semen recorded a 70 percent pregnancy rate to TAI and the gender selected semen was 56 percent to TAI. This system worked well for this producer as the heifers are kept on another farm and heat observation with subsequent breeding was not possible.