MU CVM Veterinary Medical Diagnostic Laboratory

Under the 'Scope

January 2014

The VMDL will soon be launching its portion of the RDVM portal, which will allow practitioners to sign on and see real time case results without having to call the lab.

Inside this issue:

A Message from the Director

Dr. Shuping Zhang

I hope all of you had a great holiday season and will have a prosperous new year. Please allow me to take a moment to say "thank you" for your business, your support, and your constructive criticisms. We understand that it is our privilege, not a right, to work with you to protect and promote animal well-being and public health.

As I make plans for 2014 and beyond, I am very happy to note that the VMDL has strong support across the state of Missouri and the region. I am also happy to let you know that we are fully committed to providing our clients with affordable and high quality diagnostic services in a timely manner. This year, we will pay close attention to client engagement and quality assurance which are two vital and inseparable aspects of our service.

With respect to client engagement, we will utilize all resources available to us to learn your diagnostic needs, so that we can better serve you. Please don't be surprised when you receive phone calls from us or find us at your office doorsteps or at various regional and state meetings. Our clients are the ultimate beneficiary of a functioning quality assurance program. This program has been implemented for a number of years and has helped us to grow in our areas of strength. I believe a solid quality program not only ensures the accuracy and consistency of our results, but also provides the VMDL and its clients with documentation that the procedures are performed consistently and correctly and that they meet applicable standards.

Finally, I look forward to meeting you at the 2014 MVMA Convention. Please stop by the VMDL/VMTH/CVM booths.

The Ergot Fungus

The ergot fungus (*Claviceps purpurea*) appeared to be more prevalent in pastures this last summer, and, in many parts of Missouri, ergot-contaminated grasses were incorporated into hay. These observations, our current subzero temperatures, and several recent phone calls regarding lameness and dry gangrene of the distal extremities in cattle raise serious concerns about the adverse effects of ergot on livestock performance during the next several months, when much of the stockpiled hay from this summer will be fed. Ergot produces alkaloid compounds that are toxic to livestock. The toxins constrict blood vessels limiting blood supply to the extremities, especially when it is cold. Ergotism can be confused with fescue foot during the winter because the symptoms are very similar. Ergot alkaloids can also cause abortions in cattle, as well as agalactia (no milk) and, interestingly enough, prolonged gestation in mares. The hard ergot bodies look like small rodent droppings and are easily visible in the seed head of cereal grains such as barley, oats, wheat, triticale and rye, as well as many common grasses such as tall fescue, perennial ryegrass, and timothy. (Continued on P.3)

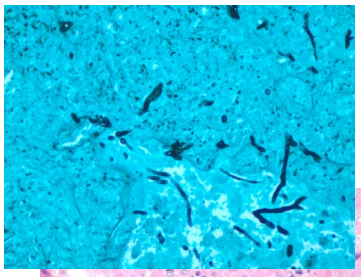
New Notes on PCR Tests

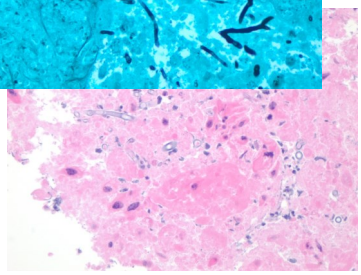
Dr. Susan Schommer

In the near future you may notice that there is a comment accompanying your PCR results. This comment does not indicate any change in our testing procedures; rather it is a result of our choice to adopt newly proposed validation standards as part of our continued commitment to our quality program. In the past there were no uniform guidelines for validating PCR tests for veterinary pathogens. Recently our accrediting body, American Association of Veterinary Laboratory Diagnosticians (AAVLD), has proposed new standards for full validation; these requirements closely align with Office of International Epizootics (OIE) standards, a very rigorous set of criteria, developed to protect animal agriculture worldwide.

I want to assure you that we have always carefully evaluated the performance characteristics of an assay prior to offering it to our clients. Before we offer a PCR test we look at the available nucleic acid sequence data for that organism as well as any published literature that might include a PCR that has been demonstrated to work on animal samples. We then test that assay under various conditions with samples known to contain that pathogen. Once we are satisfied with the repeatability and reliability of that PCR we often run it at no cost on samples meeting the disease criteria, letting the client and/or pathologist know if we find positives. We confirm that they are true positives by sequencing and then move forward with offering the test. To achieve full validation utilizing the new standards, a number of steps will be added to this process including full analysis by species and sample type.

We will pursue full validation of our PCR assays for as many species and samples types as are feasible. This process may be limited by a lack of known positive cases, especially for diseases of lower incidence and those occurring in exotic species. No matter what stage of development the assay is at, positive and negative controls are always run to ensure quality results. Our goal remains the same, to provide you with reliable results for your diagnostic needs. As always, we appreciate your feedback. If you have any questions, concerns, or suggestions for new assays please call Dr. Susan Schommer at 1-800-862-6811 or email schommers@missouri.edu.





Diagnosing Abortions

This is the time of year when the VMDL starts to get an increased number of submissions involving bovine abortions. Determining the cause of abortions in cattle can be challenging, and the cause of bovine abortion is only determined in about one third of all cases. Over the last month or so, the VMDL has diagnosed two cases of abortion as being caused by bovine herpesvirus 1 (BHV1; IBR Virus), and two other recent abortions were caused by species of fungus, as evidenced by culture results in both cases and the microscopic observation of fungal hyphae of a *Mucor* species in the fetal membranes from one of the cases (shown above). Fungal abortions generally represent less than 10% of bovine abortions and stillbirths, and their occurrence is reported to be generally sporadic in nature, affecting only one or two cows in a herd. Mycotic abortions are thought to be associated with the hematogenous spread of inhaled fungal spores (most often those of *Aspergillus* species), especially in stressed cattle being fed moldy feedstuffs.

The chances of arriving at a definitive cause of bovine abortion can be helped by the submission of the appropriate samples, along with an adequate history. If there is an abortion on "storm", samples from multiple animals should be submitted. Fresh fetal tissues, including the fetal membranes ("placenta") and a sample of maternal serum, are some of the most important samples to collect and submit to the VMDL for the diagnosis of bovine abortions. In some instances, paired samples of maternal serum can be useful in diagnosing an infectious cause of abortion. If it is not possible to submit an entire fetus, along with its membranes, to the VMDL, frozen or refrigerated samples of fetal serum (or peritoneal fluid), abomasal contents, lung, kidney, and spleen, as well as cotyledons and maternal serum, should be submitted. These should be accompanied by an adequate history and samples of fetal lung, liver, kidney, heart, spleen, intestines, and brain fixed in 10% neutral-buffered formalin.

Dr. Dae Young Kim

Dr. Tim Evans

Dr. Laura Wennerdahl

What May Work and What May Not Work in Regards to BRDC in Missouri Cattle—Trends of Antimicrobial Resistance

Over the last few years, there appears to be a drift in antimicrobial resistance to newer, but commonly used antimicrobial agents used to treat cattle affected with BRDC. The situation is of paramount importance with isolates of *Mannhemia haemolytica* over the last three years. The data is presented in the following table:

Dr. Bill Fales

Dr. Tom Reilly

Organism: *Mannheimia haemolytica* **Sources: Bovine, lung, trans tracheal wash**

Antimicrobial Agent	S*	1/1/2005 to 1/1/2011 *Mannheimia haemolytica*		4/1/2011 to 12/30/2013 *Mannheimia haemolytica*	
		% S**	N***	% S**	N***
Ampicillin	≤0.25	66%	(163)	46%	(132)
Ceftiofur	≤2.0	98%	(163)	98%	(132)
Chlortetracyline	≤4.0	75%	(163)	57%	(132)
Clindamycin	≤0.05	1%	(163)	0%	(132)
Danofloxacin	≤0.25	60%	(158)	54%	(97)
Enrofloxacin	≤0.25	74%	(163)	45%	(132)
Florfenicol	≤2.0	83%	(163)	55%	(132)
Oxytetracycline	≤4.0	33%	(163)	29%	(132)
Penicillin	≤0.12	53%	(163)	44%	(132)
Spectinomycin	≤32.0	72%	(163)	45%	(132)
Sulphadimethoxine	≤256.0	38%	(162)	29%	(132)
Tilmicosin	≤8.0	56%	(163)	37%	(132)
Tulathromycin	≤16.0	81%	(123)	44%	(132)
Tylosin (Tartrate/Base)	≤4.0	2%	(163)	2%	(132)

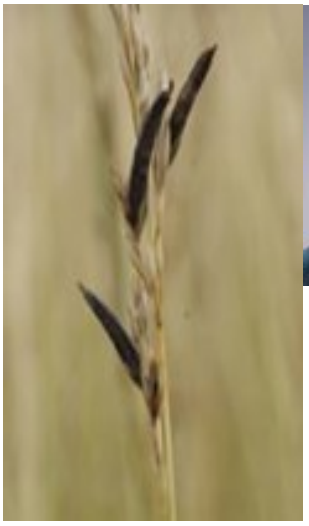
S* Breakpoint (µg/ml) S** % Susceptible N*** Number of isolates tested
**** Isolates recovered from clinical & necropsy materials at the University of Missouri CVM VMDL

The data shows that there is a drop in the number of susceptible isolates of *M. haemolytica* to Ampicillin, Chlortetracycline, Danofloxacin, Enrofloxacin, Florfenicol, Oxytetracycline, Penicillin, Spectinomycin, Sulfadimethoxine, Tilmicosin and Tulathromycin. There appears to be a trend of multidrug resistance emerging as detected with the micro-broth dilution system. However, the *in vitro* data indicate that no change in % susceptibility or resistance has occurred with Ceftiofur from 1/1/05 – 1/1/11 and 4/1/11 to 12/30/13.

William H. Fales, PhD and Thomas R. Reilly, PhD, Clinical Microbiologists

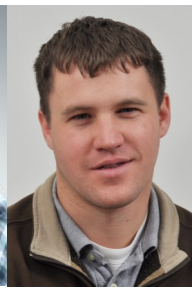
The Ergot Fungus (Continued)

Farmers should inspect stored hay for ergot bodies, and the VMDL routinely analyzes hay samples for several ergopeptine alkaloids produced by ergot, as well as ergovaline produced by the tall fescue endophyte (*Neotyphodium coenophialum).*



Dr. Tim Evans

Dr. George Rottinghaus



Ben Landers

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Fixed Tissues Can Freeze in Cold Weather!
During the recent cold weather, we have had several fixed tissue samples sent in formalin that were brought in by courier services in a solidly frozen state. The addition of 10% ethanol to formalin fixative makes them less likely to freeze, and lessens the ice crystals found on microscopic examination.
-Gayle Johnson

http://vmdl.missouri.edu/