During this past year the VMDL sent out a survey to our veterinary clients to learn about ways for us to improve our veterinary diagnostic services. Thank you to everyone who took the time to respond to the survey. Congratulations to Drs. Abby Snyder, John Clark, Michael Meyers and Annette Dixon who each won a $250 credit for veterinary diagnostic services at the VMDL for participating in the survey. We learned a lot from our survey, some good news, and some feedback that offers us an opportunity to improve. One issue that was very apparent from the survey is that while many practices are glad to use our services, actually getting samples to the VMDL is not convenient. To improve the ease of sample submission, the VMDL will supply our clients free shipping containers/supplies. To receive these shipping supplies, fill out a VMDL Supply Order Form, which is located on our 2010 Fee Schedule and at the VMDL website (www.vmdl.missouri.edu). The goal for these shipping materials is that you will have everything you need on hand when you are ready to send a sample to the VMDL. The only fee associated with these shipping supplies will be the modest cost of shipping the materials to your practice. To keep this shipping cost low, it would be best to order about one month’s worth of shipping supplies at a time. You will still be responsible for the cost of shipping the sample(s) to the VMDL. We will gladly provide your practice with pre-addressed mailing labels for FedEx, UPS or the U.S. Postal Service, whichever is your most convenient carrier. If you use FedEx or UPS pre-addressed mailing labels, there is a significant shipping discount and you are billed by the VMDL at the end of the month.

A second clear recommendation from our client survey is that improvements could be made to our sample submission form. We have designed a new sample submission form that provides a checklist of the common tests conducted by each laboratory section. We hope this will be an additional help in sample submission. As you use this form please let us know how it works for you.

Our goal at the VMDL continues to be to provide accurate and timely veterinary diagnostic service to our clients. I am personally always glad to hear about ways we might be able to improve our services. Please feel free to provide comments and suggestions to me via a phone call (573-882-8122 direct line), an e-mail bermudeza@missouri.edu or when we meet at a professional meeting.
Along with the fall colors, the usual problems will develop for practitioners dealing with Bovine Respiratory Disease Complex (BRDC) or what is commonly known as shipping fever.

The causes of BRDC are multifactorial, but practitioners must deal with outbreaks of BRDC on an empirical basis in order to control the respiratory pathogen in the bovine lung which may consist of *Mannheimia haemolytica* (*Pasteurella haemolytica*), *Pasteurella multocida*, *Pasteurella* *spp* or *Histophilus somni* (*Haemophilus somnus*).

Therefore a retrospective study and review of records from the University of Missouri Veterinary Medical Diagnostic Laboratory (UM-VMDL) was conducted from 1/1/05 - 4/25/10 to determine which antimicrobial agents would be useful for empirical use.

Lung samples were obtained at necropsy from cattle with BRDC referred to the VMDL or from Trans Tracheal Wash fluid submitted from the Veterinary Medical Teaching Hospital. Referrals usually came from herds where the morbidity and mortality rates from BRDC were high.

The bacterial pathogens were isolated and identified using standard methods. Antimicrobial susceptibility testing was accomplished with the Trek-Sensititre® minimal inhibitory concentration system (MIC) and reports were given in μg/ml.

<table>
<thead>
<tr>
<th>Antimicrobial Agent</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPICILLIN</td>
<td>R</td>
<td>&gt;16.0</td>
<td>(0.25 - 16.0)</td>
</tr>
<tr>
<td>CEFTIOFUR</td>
<td>S</td>
<td>&lt;=0.25</td>
<td>(0.25 - 8.0)</td>
</tr>
<tr>
<td>CHLOR TETRACYCLINE</td>
<td>S</td>
<td>4.0</td>
<td>(0.50 - 8.0)</td>
</tr>
<tr>
<td>CLINDAMYCIN</td>
<td>R</td>
<td>16.0</td>
<td>(0.25 - 16.0)</td>
</tr>
<tr>
<td>DANOFLOXACIN</td>
<td>S</td>
<td>&lt;0.12</td>
<td>(0.12 - 1.0)</td>
</tr>
<tr>
<td>ENROFLOXACIN</td>
<td>S</td>
<td>&lt;0.12</td>
<td>(0.12 - 2.0)</td>
</tr>
<tr>
<td>FLORFENICOL</td>
<td>S</td>
<td>1.0</td>
<td>(0.25 - 8.0)</td>
</tr>
<tr>
<td>OXYTETRACYCLINE</td>
<td>R</td>
<td>&gt;8.0</td>
<td>(0.5 - 8.0)</td>
</tr>
<tr>
<td>PENICILLIN</td>
<td>R</td>
<td>&gt;8.0</td>
<td>(0.12 - 8.0)</td>
</tr>
<tr>
<td>SPECTINOMYCIN</td>
<td>S</td>
<td>32.0</td>
<td>(8.0 - 64.0)</td>
</tr>
<tr>
<td>SULFADIMETHOXINE</td>
<td>R</td>
<td>&gt;256.0</td>
<td>(256.0)</td>
</tr>
<tr>
<td>TILMICOSIN</td>
<td>I</td>
<td>16.0</td>
<td>(4.0 - 64.0)</td>
</tr>
<tr>
<td>TRIMETH/SULFA</td>
<td>S</td>
<td>&lt;=2.0</td>
<td>(2/38)</td>
</tr>
<tr>
<td>TULATHROMYCIN</td>
<td>S</td>
<td>8.0</td>
<td>(1.0 - 64.0)</td>
</tr>
<tr>
<td>TYLOSIN</td>
<td>R</td>
<td>&gt;32.0</td>
<td>(0.5 - 32.0)</td>
</tr>
</tbody>
</table>

a – Interpretation – Susceptible, Intermediate, or resistant
b – Amount Antimicrobial agent required to inhibit the offending micro organisms
c – Range of antimicrobial agent tested

For empirical use, the following antimicrobial agents demonstrated an in vitro susceptibility of 80%, of the isolates tested where the MIC was equal to or less than the breakpoint.

- *Mannheimia haemolytica* (N=107)
- *Ceftiofur, Enrofloxacin, Florfenicol, and Tulathromycin
- *Pasteurella multocida* (N=136)
- *Ampicillin, Chlortetracycline, Danofloxacin, Enrofloxacin, Florfenicol, Penicillin, and Tulathromycin
- *Arcanobacterium pyogenes* (N=43)
- *Ampicillin, Ceftiofur, Enrofloxacin, Florfenicol, Penicillin, and Tulathromycin
- *Pasteurella spp* (N=29)
- *Ampicillin, Ceftiofur, Enrofloxacin, Florfenicol, Penicillin, Tilmicosin, and Tulathromycin
- *Histophilus somni* (N=63)
- *Chlortetracycline, Enrofloxacin, Florfenicol, Tilmicosin, Tulathromycin*
In summary it would appear that 80% of the *M. haemolytica*, *Pasteurella multocida*, *Pasteurella spp* and *Histophilus somni* isolates are susceptible to Ceftiofur (Exceed), Enrofloxacin (Baytril), Florfenicol (Nuflor) and Tularthromycin (Draxxin).

Practitioners are encouraged whenever possible, to collect tissue samples or other clinical samples prior to initiating antimicrobial therapy. Treating empirically is a place to start and when the laboratory results are returned changes can be made, if necessary, or the original course of therapy continued.

Practitioners should always keep in mind a few points with antimicrobial therapy:

- Is the offending microorganism likely to be susceptible to the antimicrobial agent selected for use?
- Can the antimicrobial agent reach the site of infection?
- Will the antimicrobial agent be present at the site of infection in sufficient concentration and time to be effective?
- Will the antimicrobial agent be biologically active at the site of infection?
- Use an adequate dose to kill the offending microorganism as “Dead Bugs Do Not Mutate”.


Rabies Testing at the VMDL
Dr. Gayle C. Johnson, Anatomic Pathologist

Although rabies testing is much more frequently done in direct association with the state public health lab system, animals or heads of animals are often submitted to the diagnostic lab with a request for rabies testing. Retrospective examination of VMDL records between 1997-2009 revealed 472 requests for rabies testing. Dogs and cats were the most frequently tested species (159 each) with fewer horses and ruminants. No pigs were submitted. Miscellaneous animals, mostly wildlife, included bats, raccoons, skunks and other species that were felt by the submitter to be behaving abnormally. Surprisingly, additional tests were done to determine the cause of illness or CNS signs in fewer than half of the canine and feline cases, while additional tests were requested in over 80% of horses and ruminants. Necropsy was requested as the additional test 81% of the time, while tissues were submitted in 19%. Among all species there was a history of a bite in most dogs and cats, and aggressive behavior alone appeared to be the only cause for testing in the dogs, in less than 10% of the cats and very rarely in farm animals (1 horse). Companion animals that bit when otherwise traumatized or that bit during separation during a dog fight were excluded from this category. Histories for wildlife usually did not involve a bite. In animals that had no history of biting, CNS signs or non-specific systemic illness were cited as reasons for testing. In cattle and small ruminants, listeriosis and polioencephalomalacia were the most frequent diagnoses in cases submitted for rabies. In horses and variety of types of encephalitis were most common. In dogs, diverse structural diseases in the CNS were most often found. These data indicate that animals are submitted to a diagnostic lab for rabies testing for a variety of reasons and that there is variability between species about the need for rabies testing. However, it is suggested that diagnostic lab submission may help in determining a diagnosis in cases where the patient’s underlying disease is not known.


Tritrichomonas Foetus testing by PCR—best practices for sample submission
Dr. Susan Schommer, Molecular Biologist

The demand for *Tritrichomonas foetus* (TF) testing is greater than ever before due to increased recognition of the disease and the rapid expansion of state import regulations. Most states accept a single PCR or 3 cultures for regulatory purposes, but be sure to check the individual state’s requirements before submitting a sample.

For the most sensitive PCR results, the inoculated InPouch™ TF should be received within 48 hours of collection. During this time the sample must remain at room to body temperature. For shipping samples in the summer it is recommended to include a cold pack separated from the sample by newspaper, paper towels or bubble wrap in a box shipped overnight. In the coldest periods of winter the same system can be used with a handwarmer-type heat pouch (such as Grabber warmers). If it is not possible to get the samples to us within 48 hours, samples may be incubated in-house vertically at 35-37°C for 24-48 hours, frozen and then shipped frozen with cold packs. Proper handling of the sample is critical for accurate test results. Death of the *Tritrichomonas foetus* organism is believed to release DNases that can decrease the sensitivity of TF PCR Samples for culture must NOT be frozen. The PCR test is $27 and pooling is not available. Results are available in 2-4 working days. Please call or email schommers@missouri.edu if you have any questions.
Garden and Yard Safety for Your Pets

Cardiotoxic Plants (affect the HEART):
- Milkweed - *Asclepias* species (see picture)
- Lily of the Valley - *Convallaria majalis*
- Kalanchoe - *Kalanchoe* species
- Foxglove - *Digitalis purpurea*
- Oleander - *Nerium oleander*
- Rhododendrons and Azaleas - *Rhododendron* species
- Varieties of Yew - *Taxus* species

Nephrotoxic Plant (affect the KIDNEYS):
- *Lilium* and *Hemerocallis* species - True Lilies (CATS)
- Rhubarb - *Rheum* species (LEAVES ONLY)
- Shamrock - *Oxalis* species

Hepatotoxic Plants (affect the LIVER)
- Cycads - *Cycad* species, such as Sago Palm
- Some Mushroom - *Amanita phalloides*

Plants Causing Multiple Adverse Health Effects:
- Autumn Crocus - *Colchicum* species (hemorrhagic gastroenteritis/bone marrow suppression)
- Castor Bean - *Ricinus communis* (hemorrhagic gastroenteritis and kidney/liver failure)
- Bulbs of Tulips, Irises, and Daffodils - Gastrointestinal and, possible, neurological signs

Fertilizers and Mulches
- Severe gastric upset and possibly gastrointestinal obstruction from iron in some fertilizers
- Nervous excitation and cardiac arrhythmias from methylanthines in cocoa mulch
- Tremors and seizures from tremogenic mycotoxins in compost

Pesticides
- Snail Bait containing metaldehyde
- Fly Bait containing methomyl
- Zinc Phosphide Mole or Gopher Bait
- Anticoagulant Rodenticides

Specific Pesticide Precautions for Pets
- Always follow ALL label instructions!!! Store pesticides in areas not accessible to your pets!!!
- Keep pets off lawns/gardens treated with pesticides for time periods specified on LABELS!!!
- Contact manufacturer if you have ANY questions!!!

*Adapted from “Keep Your Pets Safe While Maintaining Your Lawn and Garden” published on the National Animal Poison Control Center (NAPCC) website on June 1, 2006.

ERGOT ALERT FOR LARGE ANIMALS

Most of our pasture grasses are in the seed head stage now. While it is well understood that the clinical signs of fescue toxicosis are more severe when tall fescue seed heads are consumed, many grasses, including tall fescue, can also be infected by the ergot fungus, *Claviceps purpurea*, which replaces the seed head with a dark brown, purplish, or black ergot body (sclerotium). Ergot bodies contain extremely high concentrations of ergot alkaloid toxins related to the toxins which cause fescue toxicosis. Ingestion of ergot alkaloids can predispose cattle to lameness and tail injuries, even during the summer months of July, August, and September. Some animals will experience very severe heat intolerance, resembling respiratory disease, and some might even die. Removal of animals from severely affected pastures/hay or mowing pastures to remove the seed heads will help prevent and/or reduce clinical signs. The VMDL Toxicology Section runs analyses for ergot alkaloids from *Claviceps purpurea* and fall fescue endophyte on regular basis.