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Diagnostic Forum

A Quarterly Newsletter from the Indiana Animal Disease Diagnostic Laboratory at Purdue University

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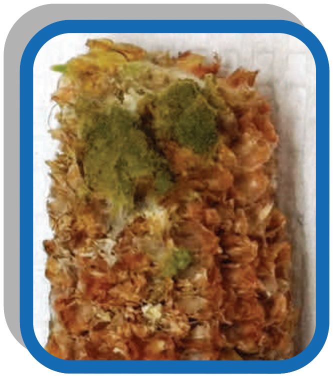
Inside the Forum

From the Director…

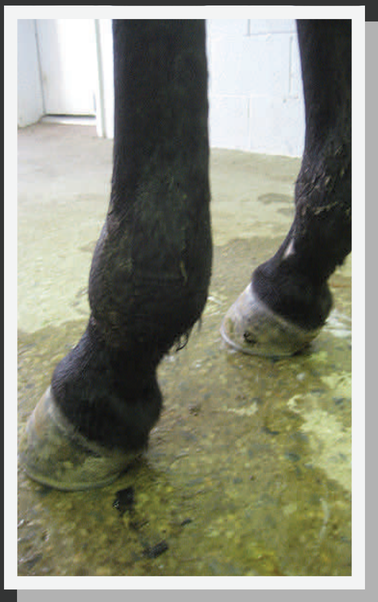
The great drought of 2012 has devastated pastures and fields throughout Indiana. Not only did the lack of rain dry up pastures which required the feeding of forages meant for winter, it also severely stunted corn growth causing an increased uptake of nitrates into cornstalks. The damp conditions this fall resulted in mold growth on ears of corn which in some cases has been associated with aflatoxin in the corn. To add to the injury in some dried-up pastures, the only plants left growing were weeds, some of which could be poisonous to livestock. This year we have had reports of exposure to poison hemlock and white snakeroot which are having a banner year. Here's looking forward to a snowy white Holiday Season (but not too snowy….).

AFLATOXINS IN CORN AND FEEDSTUFFS

By Dr. Christina Wilson and Chelsea Noffsinger



The extreme heat and drought conditions in Indiana this summer have made the corn crops more susceptible to *Aspergillus* ear rot growth. *Aspergillus flavus* mold, which is typically yellow-green or olive-green in appearance, can produce aflatoxins. These toxins can cause liver damage, immunosuppression, slow growth, and poor feed conversion in animals exposed to contaminated feedstuffs.[1] It is important to remember that observation of mold on corn or other grain does not necessarily mean that aflatoxins are present; however, it can indicate potential for aflatoxin production. Likewise, the absence of visible mold growth does not imply that the corn or grain is free of aflatoxins. Screening corn samples using a black light (UV light) to look for bright green-yellow fluorescence in damaged corn kernels is sometimes used by facilities and grain mills as a presumptive test for aflatoxin. Fluorescing samples may indicate the presence of kojic acid, a secondary metabolite produced by *Aspergillus* fungi. Caution must be taken using this procedure as kojic acid will degrade with drying time and high levels of aflatoxins in corn and grain are not linked to the production of kojic acid.[1] Therefore, it is important that the corn or grain be submitted to a laboratory for testing. Approximately 10% of the total sample submissions to the Toxicology Section thus far have tested positive for aflatoxin. These levels vary from trace amounts (≤ 1ppb) up to approximately 2,500 ppb. In order to maintain a good margin of safety for animal health, it is important to have the feedstuff tested, to store grain at less than 13% moisture, and to ensure that the corn or grain is being fed to animals/livestock below the action levels established by the U.S. FDA. For a list of the action/guidance levels for aflatoxins in animal feed, and references, see our website www.addl.purdue.edu.



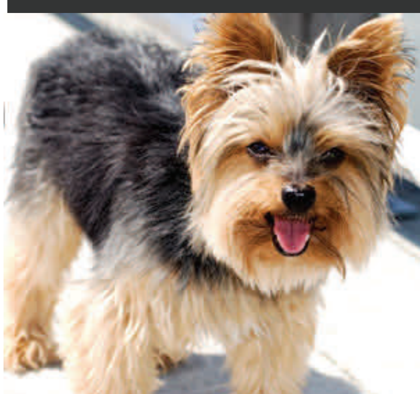
A Look Into Equine Septic Arthritis

By Dr. Lisa Hepworth, Class of 2012

Edited by Dr. Peg Miller, ADDL Pathologist

Abstract: A common orthopedic condition of both young and adult horses is septic arthritis. Equine joints may become infected by a variety of routes and by many agents including bacteria, yeast and fungi. A review of a recent case submitted to Purdue University illustrates the diagnostic and therapeutic approach as well as the poor prognostic outlook for septic arthritis caused by yeast infection.

The entire article can be found on the ADDL website www.addl.purdue.edu.



CANINE LYMPHANGIECTASIA

By Brett Andrew Grossman

Edited by Dr. William Wigle, ADDL Pathologist

Lymphangiectasia in canids is a disease characterized by dilation of the lacteals within the small intestinal villi. Though commonly grouped together with other malabsorption diseases or protein losing enteropathies, lymphangiectasia has its own distinct properties and causes. Although it has been minimally reported in cats, the majority of lymphangiectasia case studies have been described in dogs suffering from weight loss (with or without anorexia), intermittent vomiting, chronic small bowel diarrhea, lymphopenia, hypocholsterolemia, and protein loss. The secondary effects of protein loss, such as ascites, pleural effusion, peripheral edema, and hypocalcemia are the most severe signs and commonly are those first noticed by owners and clinicians.

This entire article can be found on the ADDL website www.addl.purdue.edu.

USE OF OCULAR FLUIDS AND RETINA IN POSTMORTEM ANALYSIS

Including Use of Aqueous Humor for Diagnosis of Nitrate Poisoning

By Dr. Christina R. Wilson, Head Toxicology Section & Head of Analytical Chemistry
And
Dr. Stephen B. Hooser, Veterinary Toxicologist

Visit www.addl.purdue.edu for references and a sample collection.

Postmortem analysis for chemical constituents of the blood can be difficult unless the blood is collected very soon after death and prior to coagulation. However, ocular fluids (aqueous and vitreous humor) and the retina can be useful for the diagnosis of several pathologic conditions, or exposure to various chemicals, for some time after death has occurred. Vitreous (and in some cases aqueous) humor can be used to estimate the time of death and can be useful as an aid in the diagnosis of renal disease, nitrate poisoning, hypomagnesemic syndromes, calcium status and salt poisoning (Hanna, et. al., 1990, Lincoln and Lane, 1985, McLaughlin and McLaughlin, 1986, McLaughlin and McLaughlin, 1987). Retina can be used to diagnose organophosphate poisoning, or to prove livestock exposure to some chemicals such as clenbuterol.

Increased nitrate concentrations can also be detected in the postmortem vitreous humor for up to 24 hours at room temperature (if the concentrations are very high, they can be diagnostic of nitrate poisoning up to 60h following death). This has proven very useful in the diagnosis of cattle found dead from what was later diagnosed to be nitrate poisoning. The detection of high nitrate concentrations in forage combined with high nitrates in the vitreous humor can lead to a diagnosis of death due to nitrate poisoning (Boermans, 1990).

In all species that have been examined (cattle, dogs, swine, and rabbits), urea nitrogen and creatinine concentrations in ocular fluid correlate very closely with serum concentrations for up to 24 hours (8h in rabbits) after death at body temperature (37° C). At room temperature (20 to 24° C) or refrigerated (4°C), they can be stable for longer periods of time. Therefore, postmortem vitreous humor urea nitrogen concentrations can be useful to diagnose antemortem renal disease (Drolet, et. al., 1990, Henke and Demarais, 1992, Lane and Lincoln, 1985, Schoning and Strafuss, 1981).

The use of vitreous humor for the diagnosis of hypomagnesemia in cattle has received mixed reviews in various studies that have been performed. In some, vitreous and serum magnesium concentrations have been reported to correspond for 36 to 48h postmortem at 24°C (Lincoln and Lane, 1985). However, another study using over 250 cows concluded that serum and vitreous magnesium concentrations did not correlate closely enough to diagnose antemortem changes in serum magnesium (McCoy and Kennedy, 1994). Therefore, to diagnose hypomagnesemia in cattle, it would be necessary to combine clinical signs and an appropriate history with vitreous humor magnesium concentrations.

Also, the use of vitreous humor to estimate the antemortem calcium and sodium serum concentrations has had mixed reports. Some studies report that both are stable in the vitreous humor and substantially reflect the serum concentrations, while others dispute this. Therefore, the use of postmortem calcium and sodium concentrations in the vitreous must also be correlated to history and clinical signs.

Vitreous humor has been used to roughly estimate the time of death in several species. It can be useful up to 48 to 72h postmortem. This is done by measuring the increase of potassium or phosphorous into the vitreous over time. Since the amount of release varies with temperature, it is important to report the temperature of the animal during the postmortem time interval (Crowell and Duncan, 1974, Schoning and Strafuss, 1980).

Retina can be useful for postmortem diagnosis of organophosphate poisoning and for evaluation of antemortem exposure to certain illegal drugs such as clenbuterol. Since it is a neural tissue, retina contains a large amount of cholinesterase which is inhibited by organophosphate insecticides. This inhibition can be measured in the same manner as it is in brain or blood. Measurement of retina cholinesterase inhibition has been successfully used to diagnose organophosphate exposure up to 24h postmortem (Harlin et. al., 1989, Harlin and Dellinger, 1993). In addition, the retina can concentrate some drugs such as clenbuterol, and store them for long periods of time. Therefore, retina can be used to evaluate the exposure of livestock to this illegal drug (Biolatti, et. al., 1994).

Purdue ADDL and Heeke ADDL will be closed on the following University holidays in 2012.

November 22-23……………………………..……Thanksgiving
December 24-25……………………………………..Christmas
December 31st…………………………………New Years Eve
January 1st……………………………………..New Years Day
January 21st……………………………..Martin Luther King Day

ADDL Lab Results are available by:

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  Lab results are available on the Internet. Call to set up an account or go to our web page, then

  1. **Click on Online Reports Tab**
  2. **Click on Request Info and follow instructions.**

Reduced UPS shipping rates for ADDL Clients

- ADDL has reached an agreement with UPS for submitters to send samples to the West Lafayette Lab at a reduced rate using its Authorized Return Service. Packages will usually arrive at ADDL the following morning.
- Pre-addressed labels will be provided to you by ADDL.
- Submitter will be billed $7.00 per package (up to 15 pounds).
- Call us at 765-494-7440 or visit our website to request labels.
- If multiple cases are submitted in a single shipment, the UPS charge will be added to one case.

If you are currently using our histopathology mailers (via U.S. mail) and would prefer taking advantage of the UPS option with its guaranteed delivery time, we will provide you the formalin-filled containers without an address label at $15/box of 12.

GlobalVetLink is available for electronically requesting and reporting Coggins tests (Equine Infectious Anemia). Both ELISA and AGID testing is available at $8.50/test with no accession fee. In order to have access to a GlobalVetLink account, contact the company directly at www.globalvetlink.com or phone 515-296-0860.

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