



# Newsletter

Volume 2, Issue 1

March 1997

Quarterly Publication of the **Arizona Veterinary Diagnostic Laboratory** and Cooperative Extension

## From the Director

This month we will be updating our mailing list and would like to hear from you, the user of the lab. Your comments or suggestions on any topics you would like to see included in future issues of the AzVDL Newsletter or format changes would be greatly appreciated. We have enclosed a postage paid reply card which we hope you will find the time to fill out and return to us indicating your interest in our newsletter. We will be paying special attention to the comments or suggestions section to improve future issues as well as any additional names of clients or associates you feel would be interested in receiving the publication.

## Small Animal Toxicology

The three major categories of tests performed on canine and feline submissions by the toxicology section of the AzVDL for 1996 were tallied and the results are summarized below. The most common test requests for organic toxicants were for **strychnine** (35% of the total) and **ethylene glycol** (20% of the total). Requests for **acetylcholinesterase** screening for organophosphate and carbamate pesticide exposure were the most numerous (45% of the total).

Enzyme activity is subnormal where there has been pesticide (organophosphate/carbamate) exposure. The large number of **acetylcholinesterase** test requests is accounted for by the fact that this is a common screening request made at necropsy by diagnosticians at this laboratory for animals that are presented to us for determination of the cause of death. The test is easy to perform and brain tissue collected at necropsy is the sample of choice. Whole blood from the live animal is also suitable.

**Strychnine** is apparently the toxicant of choice for the malicious poisoning of pets and sometimes, wild or feral birds. The AzVDL reported 19 positive samples of cases tested for 1996, 16 involving stomach contents from dogs and three were crop contents from birds. No positive samples were reported from cats although a few were tested. Two suspected baits were tested but these were negative.

**Ethylene Glycol** is apparently less frequently used by the malicious poisoner with a total of seven positive canine and two positive feline samples being reported out for 1996. Vomiting is a prominent clinical sign of poisoning by this substance, and this is reflected by a lower number of positive stomach contents (3 total, 2 from dogs and one from cats) being reported for the year. The remaining positives were from urine, serum or whole blood. All are acceptable samples and usually only stomach mucus is available at necropsy.

Determination of the chemical composition of **urinary calculi** is also a frequent request made of the AzVDL toxicology section. During 1996, 25 cases were received requesting this service. Most were calculi removed at surgery from the urinary bladder of dogs (19 total). The composition of the canine calculi was as follows: 10 **struvite**, 7 **calcium oxalate**, and 1 **cystine**. One feline sample was received (**struvite**). Renal calculi (calcium oxalate) were received from a jaguarundi. Three calculi of unspecified origin from chuckawallas and one from a python were received, all were composed of uric acid.

For a more complete listing of toxicology test offerings, call us for a test and fee schedule.

*by T.H. Noon and Tamara Dallabetta*

## Diagnostic Update

The following are selected samples of cases submitted to the AzVDL during the winter months of December, January and February.

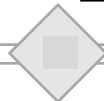


### Bovine

**Atypical interstitial pneumonia** was diagnosed in fixed lung tissue from a four year-old holstein cow. The cow was one of two which died after acute onset of respiratory distress. Gross necropsy had revealed pulmonary emphysema and edema.

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**Neospora sp. abortion** was diagnosed in a five month gestation Holstein fetus. This was one of six abortions in a group of 80 animals recently imported from California. The abortions occurred over a three week period.

**Selenium deficiency** is widespread throughout much of the state, and one of the most important production diseases in beef herds. Several cases were diagnosed at AzVDL during the last quarter. Cases ranged from a classical “white muscle disease” in a 6 month old Texas longhorn heifer fed hay only, to the much more common reproductive disease, diarrhea and unthriftiness observed in deficient beef herds. Reproductive diseases usually involved late term abortion, stillborn or weak calves, and a high incidence of retained placentas. Coexistent fetal infections are commonly diagnosed in cases of abortion in selenium deficient herds. *Chlamydia* and *Aspergillus flavus* infections were diagnosed in aborted feti from two herds where selenium deficiency was also diagnosed. Increased susceptibility to infection is also commonly present in young calves of deficient herds.

Increased incidence of **coliform mastitis** was correlated with low serum levels of selenium and vitamin E in one dairy herd.

A six month-old, black white-face heifer was one of three dead animals from a herd of 300 on pasture in Yavapai county. Gross necropsy examination revealed emaciation, diminished muscle mass and serous atrophy of epicardial and perirenal fat. Antemortem blood specimens demonstrated **deficient serum vitamin A and whole blood selenium** values. Serum copper levels were marginal. The findings were indicative of nutritional problems that are not uncommon in Arizona range cattle.

**Salmonella dublin infection** was diagnosed in four separate cases of calf salmonellosis of high morbidity affecting calves ages 2 weeks to 2 months. Septicemia and enteritis were observed in all cases. In addition *Salmonella dublin* was isolated from the intestines of a 2 day old calf where the primary cause of death was considered to be septicemic colibacillosis.



## Porcine

**Proliferative enteritis** was diagnosed in a 70 lb. 4-H pig which died following a one-week history of anorexia and diarrhea. The diarrhea was occasionally bloody. At necropsy, the pig was dehydrated. The distal jejunum and ileum were thickened and turgid (so-called “garden hose gut”). The lumen was filled with a cast of yellow-brown fibrinonecrotic material. Cultures for *Salmonella sp.* were negative. *Lawsonia intracellularis* is the newly coined name for the causative agent.



## Small Ruminants

**Rumen tympany (bloat)** was the cause of death in two Rambouillet ewes received for necropsy examination. The owner had lost 50 ewes from a flock of 3000 ewes on alfalfa pasture.

**Tetanus** was diagnosed in a 6 week old male Nubian goat which had been recently castrated by banding. Two other goats had died on the premises on the days following castration. The goat exhibited the typical extensor spasms and hyperesthesia of the disease. The castration would had an active purulent reaction and massive numbers of bacteria, including many clostridia-like sporulated rods.



## Canine

**Cardiomyopathy** was the cause of death in a 7 year old Kerry Blue terrier. The dog reportedly came into the house, ate a cookie, sat down, leaned against the wall and collapsed to the floor dead. There was no recent sign of illness. The sire of this dog had died of congestive heart failure secondary to cardiomyopathy.

**Epitheliotropic lymphoma** (mycosis fungoides) was diagnosed from a gingival biopsy specimen. This 10 year old, Welsh Corgi was presented with intense hyperemia of the mucous membranes of the lip and gingiva. There was minimal periodontal disease. Oral mucosal disease is one of four possible presentations of epitheliotropic lymphoma and can easily be confused with chronic, nonspecific stomatitis. Biopsy will differentiate the two conditions.

A case of suspected **drug related hepatotoxicity** was seen in a four month-old, castrated male, Labrador retriever. The dog was originally obtained from a shelter and was presented for coughing, vomiting, and gurgling noises in the lungs since adopted. The dog had a tender trachea and mucopurulent nasal discharge but the lungs were clear on physical exam. Tribissen® and Flagyl® were dispensed. Approximately two weeks later, the dog presented with anorexia, lethargy and vomiting. The dog was depressed and icteric. Status epilepticus developed and the dog died later that day. Necropsy revealed a small liver with numerous, random 1-3 mm, irregular dark foci corresponding to microscopic lesions of acute hemorrhagic hepatocellular necrosis. Portal areas exhibited mild biliary hyperplasia and infiltrates of lymphocytes, plasma cells and a few neutrophils. There was mild, multifocal bile stasis. Idiosyncratic hepatotoxicity has been reported following treatment with Tribissen.®

Severe adrenocortical atrophy resulting in **hypoadrenocorticism** was the cause of death in a one and one-half year old mixed breed dog. The dog presented

with a history of vomiting and anorexia. At necropsy, the adrenal glands were small with only a thin rim of cortical tissue. Microscopically there was diffuse lymphoplasmacytic infiltration of the adrenal cortex and severe loss of adrenal cortical cell populations.

**Malignant Lymphoma**, multicentric type, was diagnosed in an 85 pound, one-year-old Bull mastiff following lethargy and weight loss that began about a month prior to its death. "Pitting edema" and "vomiting" was noted terminally and the dog was euthanized. Multi-organ involvement by the neoplasm (spleen, liver, lymph node) and prominent mediastinal masses located in the area of the thymus were found.

**Ileocecolic intussusception** was diagnosed in a 3-month-old Akita that had been observed to be vomiting and anorectic. "Bloating" of the abdomen was noted terminally. Necropsy revealed bloating of the abdomen and intussusception of approximately 5 inches of distal ileum into the proximal colon through the ileocecolic junction. The small intestine proximal to the lesion was distended and contained a moderate amount of gas and turbid fluid.

**Septicemia** was diagnosed in a 12 day old toy poodle. Clinical signs that were noted included "failure to thrive" and "seizures". Necropsy revealed meningeal infiltrates of mixed leukocytes with exudate accumulations on meningeal surfaces and an interstitial pneumonia. Moderate to heavy growths of beta-hemolytic *E.coli* were isolated from lung, brain, bone marrow, and kidney.

An **islet cell carcinoma** was diagnosed in a 10 year old German shepherd female with a long history of diarrhea and occasional vomiting. The pancreatic tumor was multiple and involved lymph nodes. There was also mucosal hyperplasia of the stomach and multiple duodenal ulcers. Although a conclusive diagnosis will not be reached until we can demonstrate gastrin secretion in the neoplastic cells, the clinical history and digestive lesions strongly suggest a case of **gastrinoma**.

**Chlamydiosis** was diagnosed in two neonatal German shepherd puppies. A two-day old and a three-day old (out of a litter of 10 puppies) were received for necropsy. Both puppies had appeared healthy at birth and had nursed normally. But two litter mates had been born dead and two more puppies had died during the first day of life. *Chlamydia psittaci* was isolated from the lungs and livers of both puppies using tissue cultures. In addition *E. coli* and *Klebsiella* sp. Were isolated from the internal organs of one of the puppies, and *Streptococcus* sp. from the other puppy. Liver selenium levels (at 0.11 and 0.08 ppm) were much lower than the reported adequate levels of 0.5 to 1.5 ppm. The combination of chlamydia infection and selenium deficiency has been observed in several other

animal species, but very little is known about selenium deficiencies in dogs.



## Feline

A **peritoneopericardial hernia** was the cause of acute dyspnea and death following anesthesia for dental prophylaxis in a one-year-old, male Persian. At necropsy, the pericardial sac was distended by the herniated left medial and quadrate lobes of the liver. The lobes passed through a 4 cm diameter, smooth rimmed rent in the diaphragm. The capsule of the herniated lobes were adhered to the visceral surface of the pericardium. Peritoneopericardial hernias can develop as congenital defects or following trauma. The former is most likely in this instance due to the young age of the cat, the apparent chronicity of the hernia and the smooth margins of the defect in the diaphragm. Presumably the stress of the procedure precipitated acute cardiac decompensation.

**Hypertrophic cardiomyopathy** was the cause of death in a seven month old, domestic shorthair cat which died during recovery from anesthesia for an elective procedure. During recovery, every thing seemed normal until the cat collapsed with red tinged fluid coming from the nose (pulmonary edema).

A six month-old, Maine Coon cat was presented with the complaint of vocalizing and falling down. This was followed by twitching of the whiskers on the left side, left eye blepharospasm, salivation and "holding the right rear leg funny". Two similar episodes followed that night. The owner returned home following an errand to find the cat dead. At necropsy, there were microscopic lesions of acuted neuronal necrosis in the cerebral cortex consistent with an ischemic injury such as **feline ischemic encephalopathy**.



## Avian

*E coli* was isolated from the intestine of a Chattering lory with acute, multifocal, necrotizing enteritis. Clinical signs noted before death included lethargy and polydipsia.

**Impaction of the proventriculus and ventriculus** with stones and coarse, dry roughage was diagnosed in an adult male ostrich. The bird was 3 1/2 years old and was kept alone in a pen. The bird had been "lethargic" for 2 months when its condition suddenly worsened and it died the same day. The owner also noted that the bird emitted a "barking" sound when eating or drinking. Emaciation was also noted in addition to the impaction.

**Salmonellosis** was diagnosed in 3-day-old Bobwhite quail chicks that had recently arrived from a breeding farm in

Texas. The owner noticed that many of the chicks were dead upon arrival or died within a day or two after a period of lethargy. Fecal pasting of the vent was seen in a few of the birds. Infection likely occurred prior to their arrival in Arizona.

**Renal adenocarcinoma** was diagnosed in a 3 year old parakeet. The bird was observed to hold up the right leg prior to death, a characteristic sign of this condition. On necropsy, the neoplastic right kidney compressed the ischiatic nerve and infiltrated the synsacrum.

*Aspergillus fumigatus* was isolated from the lungs of a 5 week old Blue and Yellow macaw which died of acute pulmonary aspergillosis. This infection is common in young chicks from most avian species and results from the inhalation of airborne *Aspergillus* conidia in heavily contaminated nests. There are over 600 species of *Aspergillus*, among the most common environmental contaminants, but only a few are capable of producing internal infections. *A. fumigatus* is the most frequently isolated agent from avian infections.

**Chlamydiosis** was diagnosed in an adult Cattle Egret found dead in a zoo collection. The bird was found dead. An enlarged, swollen liver was evident at necropsy. Microscopic examination revealed an acute hepatitis. *Chlamydia psittaci* was isolated from liver and lung using tissue culture.

**Hemochromatosis** along with nephritis and visceral gout was diagnosed in a 9 year old female Guan. The bird was noted to be thin and lethargic. Microscopic examination of liver revealed prominent deposits of iron-positive pigment in hepatocytes and Kupffer cells. Accompanying microscopic lesions included prominent bile duct proliferation, hepatic cord disruption, and infiltrates of mononuclear leukocytes in portal areas. Random foci of hepatocellular necrosis were also evident. Analysis of unfixed liver tissue revealed over 5000 ppm iron which is well in excess of normal. Hemosiderosis or iron accumulation without associated pathologic changes is a more common diagnosis made in avian species at the AzVDL compared to hemochromatosis, in which pathologic changes are often prominent.



## Wildlife

**Rabies** was diagnosed in a skunk from the Fort Huachuca area of Arizona. The animal was found dead in a roadside ditch by a wildlife biologist doing a field study of small mammals in the area. Submissions of skunk, fox, raccoon, or bat specimens to the AzVDL, whether rabid or not, always prompt extra precautions and a mental review of one's own vaccination status. These

species are the principal reservoirs of rabies in North America. One should also be careful when handling any animal of unknown or uncertain vaccination status especially those having clinical signs referable to the nervous system. A history of behavior change or unexplained, progressive paralysis of a body part would be highly suspicious. In suspect cases submitted to the AzVDL, selected specimens of brain tissue will be submitted to the Arizona Department of Health Services Laboratory for fluorescent antibody screening.

**Herpesvirus** infection causing acute, necrotizing hepatitis, esophagitis and splenitis was diagnosed in two Great Horned owls from the Phoenix area.

**Secondary poisoning due to ethyl parathion** was diagnosed in a Great Horned owl found dead in the Phoenix area. The remains of a bird along with a few grain kernels were found in the upper digestive tract of the owl. Subnormal acetylcholinesterase activity was found in brain tissue from the owl. This was suggestive of exposure to organophosphate or carbamate-type insecticides. Testing of the bird remains in the owl's digestive tract revealed ethyl parathion which is an organophosphate insecticide used for commercial crop application. To the best of our knowledge, the source of the compound was not determined.

**Canine distemper virus** infection was diagnosed in a female coatimundi from the Fort Huachuca area and in a young male badger from Maricopa county.

*Pasturella multocida* pneumonia was diagnosed in a javelina estimated to be 2 weeks of age that was found in a suburban area of Tucson. Clinical signs were not described other than the "reason of death was unknown".

## Exotics



*Penicillium sp.* was isolated from the lungs of a Panther chameleon with bronchopneumonia. The owner had lost 75% of his breeding stock over the prior month. The clinical signs varied from a slowly progressive disorder followed by death to acute death in less than 72 hours. Treatment with antibiotics was not effective. Only adults are affected. Juveniles and hatchlings were kept in a separate room. The owner reported that the room was cleaned often with diluted bleach. The diet consisted of crickets dusted with calcium-vitamin D<sub>3</sub>. At necropsy, there were miliary 2-3 mm diameter white nodules scattered throughout the lungs. Microscopically the nodules were composed of fungal mycelia intermixed with debris, mucus and degenerating macrophages and heterophils.

**Sarcoptic mange** was diagnosed in a 2 1/2 year old

guinea pig. Dermatitis over the lumbar region was noted 8 months previously but skin scrapings made at that time were negative. The owner elected for euthanasia and at necropsy the skin of the lower jaw and neck areas was thickened, scurfy, and scaly. Sarcoptic mites were found in scrapings of the lesion and were also visible in microscopic sections as arthropod cross-sections in epidermis.

A six month old python died following a two week history of chronic skin disease. There was multifocal ulceration of the skin noted at necropsy. *E. coli* and *Pseudomonas aeruginosa* were isolated from multiple body organs. **Ulcerative skin disease** in reptiles is thought to be a consequence of unsatisfactory hygiene. Bacteremia is a common sequelum.

**Disseminated coccidiomycosis** was diagnosed in a nine year old Capuchin monkey. The monkey died after exhibiting lethargy, weakness and incoordination of one week duration. The *Coccidioides immitis* titer was positive. At necropsy disseminated granulomas with spherules were found in the brain, meninges, liver, kidney, lung, thyroid glands, adrenal glands and mediastinal tissue.

**Cryptosporidiosis** was diagnosed in a Leopard gecko. The owner reported having many "sick" geckos. The infection was limited to the intestinal tract.

**Mycoplasmosis** was the diagnosis in four rats from a group of 1500 rats. The owner reported that 1-2% mortality occurred each week and had persisted for 3-4 months. Clinical signs included circling, listlessness, sniffles and diarrhea. At necropsy, the animals all had chronic, suppurative otitis media, bronchopneumonia, and rhinitis.

by Greg Bradley, T.H. Noon, Carlos Reggiardo

Comments on Diagnostic Update can be directed to Dr. Greg Bradley via e-mail at: gabrad@ag.arizona.edu

## Submission tips: Abortions

The preferred specimen, regardless of the species, is the entire fetus plus placental membranes. Aborted fetuses come in all ranges of decomposition but have diagnostic value regardless of condition. Even mummified fetuses can provide some useful information.

Care in shipment is needed to prevent leakage of fluids and the associated public health concerns. Double bagging with plastic garbage bags is usually effective. Shipping containers should also resist leakage. Styrofoam ice chests work well if taped tightly shut. Plastic or metal ice chests are ideal and we will ship them back to you so that they may be reused. Sufficient ice or ice-packs should be

placed in the container to prevent spoilage. Fetuses should never be frozen.

A completed AzVDL submission form which includes the clinical history should be placed in a separate waterproof bag and taped to the lid of the container for shipment. This will prevent the paper work from becoming wet and illegible if leakage should occur. Please be sure to include on the form the gestational age of the fetus, breed, vaccination history, pertinent herd history, pasture type or feed type and any other information you deem relevant.

If shipping the entire fetus is not practical in your situation then the following list of specimens should be collected and submitted.

1. Fresh tissues: lung, liver, kidney, heart, spleen, and placenta.
2. Formalin fixed tissues: placenta, lung, liver, kidney, heart, spleen, brain, skeletal muscle, any grossly visible lesions.
3. Other: Thoracic fluid and blood (sterile red-top tube), stomach contents in a sterile container (a capped syringe works).
4. Dam: Red-top and purple-top tubes of blood. During abortion storms, blood from additional animals in the herd may be requested.

Owners should be informed that, nationwide, on average only 25-30% of aborted feti have an identifiable etiology at necropsy. The remainder are presumed to be due to maternal factors.

A review of our records for 1996 revealed a variety of etiologies for livestock abortions.

Among bovine submissions a number of bacterial agents were identified including *A. pyogenes*, *Campylobacter fetus* var. *venerealis*, *Streptococcus* sp. In addition there were protozoal abortions due to *Neospora* sp. No viral or mycotic abortions were seen. Trace mineral deficiencies (selenium, copper) were concomitant factors in several abortions.

A number of equine fetuses were examined. Most were bacterial abortions. Etiologic agents isolated included *Klebsiella* sp., *Streptococcus equi* susp. *zooepidemicus*, and *Aeromonas hydrophila*. One mycotic abortion was seen. No viral agents were identified.

*Chlamydia* sp. was the only agent identified in the small number of caprine fetuses received for examination.

Vitamin E deficiency was found in sows aborting fetuses from one operation. No infectious agents were identified.

by Greg Bradley

We welcome any subscriptions, comments or suggestions.

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By vehicle the only access to the AzVDL is via Prince Road (I-10 Tucson exit 254), south on La Cholla to the West Campus Agricultural Center Farm. Follow the signs and the dirt road to the facility.

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An electronic version of the AzVDL Newsletter can be accessed at: <http://microvet.arizona.edu>

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, James A. Christenson, Director, Cooperative Extension, College of Agriculture, The University of Arizona.

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