



Newsletter

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From the Director

We will miss Dr. Edward J. Bicknell who has retired (see p. 6.) This leaves the state of Arizona without an extension veterinarian and there are apparently no plans to fill this position in the near future. Unfortunately, the loss of Dr. Bicknell's participation in diagnostic services will further increase the day-to-day workload in the Diagnostic Laboratory but with help from others in the Veterinary Science and Microbiology Department we will respond to extension and outreach needs whenever we can.

Robert D. Glock, director

Field investigations of Ash Fork horse deaths

The Diagnostic Laboratory has been involved in investigation of the highly publicized deaths of about twelve horses and a mule in the Ash Fork area. The first deaths were reported last fall. We became involved in late November when some tissues were submitted. Submitting veterinarians felt that botulism was a possibility. We received a number of specimens including horses for necropsy. We eliminated a number of possibilities but could not confirm the presence of botulinum toxin either in our laboratory or at the Botulism Diagnostic Laboratory at the University of Pennsylvania. In early February a team of diagnosticians from the USDA, The Arizona State Veterinarian's Office, and our laboratory joined for an on site investigation. About the same time some spores of *Cl. botulinum* type C were identified in intestinal contents of three horses by the Botulism Diagnostic Laboratory. This strengthened the still-presumptive diagnosis of botulism. Testing is still in progress primarily at National Veterinary Services Laboratories in Ames, Iowa. This situation underscores the difficulty of diagnosing botulism in the equine. For more information on botulism please see our previous newsletter (December 1998) or contact us at 520-621-2356.

The AzVDL is not provided specific funds to conduct field investigations or react to animal health emergencies. We must charge fees to cover most of our operating expenses. Unfortunately, it is not always feasible for owners to pay the cost. In the Ash Fork situation, a majority of the cost of the investigations on specimens submitted to us came out of the diagnostic laboratory budget. We'd welcome any ideas about a source of support which would permit a more aggressive response on our part when problems in the field suggest a need for more thorough investigation.

Diagnostic Update

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



Bovine

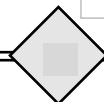
Leptospirosis was diagnosed in some feedlot steers from several different premises. The diagnosis was based on the observation of leptospire in sections of the kidney of one animal and some moderately elevated titers of *L. pomona* (up to 1:1600) in a few other animals. The syndrome involved primarily Holsteins and was characterized by icterus, yellow livers, and red urine. We were unable to identify leptospire in mailed-in urine by culture or direct microscopy. It seems that the number of organisms in some of these animals must be quite low making them relatively undetectable. Serum titers were not consistently elevated. Clinical use of vaccines

appears to have helped reduce losses.

Brain lesions typical of **thromboembolic meningoencephalitis** (TEME) caused by *Hemophilus somnus* were identified in feedlot steers with some CNS signs that died suddenly. There were also typical zones of necrosis and inflammation in the myocardium. We were unable to isolate the *Hemophilus somnus* which is sometimes difficult to grow, especially in animals that have been treated with antibiotics. Pneumonia due to *Hemophilus*

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somnus can sometimes be differentiated from pasteurellosis by identifying focal areas of hemorrhage or necrosis in the myocardium, particularly in the papillary muscles.

Rabies was diagnosed in a roping steer from the Douglas area. The steer had recently been brought from an area of Mexico where vampire bat rabies is endemic.

Nitrate poisoning was the cause of death of two cows from New River. They were fed “cow hay” containing large amounts of pigweed stems. Two samples of hay were analyzed for nitrate and found to contain 3.6 and 5.2% nitrate. Levels of 1.0% or higher are considered capable of producing acute toxicity in the bovine.

Chronic, fibrinous bronchopneumonia was diagnosed in an eight-month-old crossbred Hereford heifer that was part of a group of eleven that had been trucked in from a native grass pasture in the Tucson area and fed alfalfa for a week. One other calf had died as well. *Pasteurella hemolytica* and *Actinomyces pyogenes* (formerly *Corynebacterium pyogenes*) were isolated in cultures of the lung lesions. Screening for the most significant bovine viruses (BRSV, BVD, IBR and PI3) was negative. Chronicity of the lesions may have precluded detection of these viruses. Stressors such as weaning, transport, confinement, and feed change, to list a few, are usually contributory to the occurrence of bovine respiratory disease. In addition, liver selenium and copper levels were marginal (0.10 ppm and 22.5 ppm, respectively). It is reported that marginal or deficient trace mineral status will impair the bovine immune response.



Equine

Septicemia by *Enterococcus faecalis* was the cause of death of a neonatal Arabian colt which died shortly after birth. A pure culture of *E. faecalis* was isolated from samples of brain, liver, lung and stomach, as well as from the placenta. There was an acute purulent placentitis.

Adenocarcinoma of the stomach with metastasis to the liver, spleen, mesenteric lymph nodes, ovary, uterus, adrenal gland, lung and omentum was the cause of death in a fourteen-year-old Quarterhorse mare. The mare had a three day history of depression. Fever, jaundice, anemia and hemoglobinuria were noted on physical exam. In the horse, adenocarcinoma of the stomach is much less common than squamous cell carcinoma.



Small Ruminants

Chlamydial abortion was diagnosed in two exotic sheep fetuses that were submitted for necropsy. The organism was isolated from lung and liver tissue from the fetuses. No other pathogens were found.



Avian

Foreign bodies in the ventriculus were diagnosed in a young adult chicken that was very thin and emaciated. There was a history of some bloody stools. This bird's ventriculus was about 1.5 times normal size and there was hypertrophy of the muscle. It contained a small amount of ingesta and six zinc-coated roofing nails. Liver zinc levels were within normal limits. Fluoroscopy of several other poor-doing birds from this group of pets indicated the presence of nails in the ventriculi of all of them.

Psittacine proventricular dilatation syndrome was diagnosed in an eight-month-old female conure with a history of sudden death. Grossly, the bird had a dilated, thin-walled proventriculus. The ventriculus was shrunken and empty. Undigested seeds were found in the small intestine. Characteristic ganglioneuritis was found in the esophagus, crop, proventriculus, ventriculus, small intestine, adrenal gland and heart. A mild, nonsuppurative encephalitis was also present. To date, an etiology has not been established for this syndrome.

Avian polyomavirus infection was the cause of death in a six-week-old, Moluccan cockatoo. Gross lesions were typical of the disease and included hepatomegaly, petechial hemorrhages on the heart and pericardial effusion. The disease was confirmed by the microscopic lesions of multifocal necrosis in spleen, liver and heart with intranuclear inclusions and karyomegaly.

Type C **botulism** was diagnosed in a duck from a municipal pond in the Phoenix area. The duck exhibited signs of weakness but not the typical “limberneck” posture.

Vitamin A deficiency and *E. coli* **septicemia** were diagnosed in an eight-year-old Himalayan pheasant from a flock with a history of conjunctivitis and weight loss. A chronic conjunctivitis and squamous metaplasia of the glandular epithelium of the esophagus were associated with the avitaminosis A. Serum vitamin A was non-detectable (<0.08 ug/ml). An acute interstitial pneumonia and an acute, necrotizing hepatitis were also observed and believed to be produced by the bacterial septicemia.

Acute pancreatic necrosis with diffuse peritonitis and necrosis of the adjoining duodenum were found in an adult male Pionus submitted for necropsy after a sudden death.

Parasitic conjunctivitis is an infrequent observation in a variety of avian species. Numerous flukes of the genus *Philophthalmus* were recently found in conjunctival scrapings of an emu from central Arizona with a history of a severe, chronic conjunctivitis refractory to antibiotic treatment.

Atoplasmosis was the cause of death of a four-year-old Bali mynah, which was found dead without evidence of prior clinical disease. Although no gross lesions were observed on necropsy, heavy perivascular infiltration by leukocytes and macrophages (often with intracellular parasites) were observed in lung, liver, heart and skeletal muscle.



Canine

Coccidioidomycosis was diagnosed in a sixteen-month-old female Bull Mastiff weighing 86 pounds. The dog was originally from out-of-state. It had been sick for a month and died suddenly while being taken to submitting veterinarian. The dog had been lethargic, febrile (104-106 F), and had peripheral lymphadenopathy and some coughing. Total leukocyte numbers were within normal limits. Coccidioidomycosis was suspected. Serology (both AGID and CF tests), however, was negative but chest radiographs revealed some "abnormalities around lungs." The dog had been treated with Nizoral® for an unspecified period of time. Necropsy revealed consolidation (i.e. sank in fixative) and dark red discoloration of the apical and cardiac lobes of the right lung. There was also a large, firm, granulomatous lesion in the mediastinum posterior to the tracheal bifurcation. Histologic examination of the mediastinal lesion revealed granulomas that contained a few degenerate spherules of *Coccidioides immitis*. Cultures of the lesion and the affected lung tissue were negative for the organism. It was felt that the lack of a measurable serologic response was remarkable given the fact that a few coccidioidal spherules, although degenerate, were present in the mediastinal lesion suggesting that at least some antigenic stimulus should have been present. Perhaps the dog was unable to generate an antibody response.

Glomerular amyloidosis was diagnosed in a three-year-old Shar-Pei with a history of weight loss, vomiting, mildly elevated BUN and creatinine, and severe (4+) proteinuria. There was heavy glomerular localization of amyloid in the kidneys, with only minor medullary localization. There were multiple pulmonary thromboses as well, a common finding in dogs with a nephrotic syndrome due to amyloidosis. This pattern differs from the typical familial amyloidosis in Shar-Pei dogs where medullary and interstitial renal involvement is seen.

A neuroendocrine carcinoma (carcinoid) of lung and heart was found in the necropsy of a nine-year-old male bulldog with a history of poor appetite, weight loss and heavy breathing. The primary tumor appeared to be a single, spherical mass in the right diaphragmatic lobe of the lung, with multiple cardiac metastases in the left atrium and ventricle.

Acute septicemias by *Streptococcus canis* (group G) were the cause of death of adult dogs in two separate cases; a

six-year-old male Rottweiler and an adult female Shar-Pei (age not specified). The primary source of the infection was not determined in either case.

An adult Chow was presented with a history of lethargy and rather sudden death. Gross lesions included swollen and moist appearing kidneys with streaks in the cortex. **Acute nephritis** was identified microscopically and a heavy population of *E. coli* was isolated from the kidney.

A dog was presented for necropsy with a history of unexplained deaths in four dogs, three cats and a rooster. The only significant findings at necropsy were some small dark colored granules in the stomach. There were no significant microscopic findings in the tissues but **Aldicarb** (Temik®), a carbamate insecticide, was identified in stomach contents. Cholinesterase levels in the brain were also subnormal. This is a rather potent agricultural pesticide that has been misused repeatedly for malicious poisonings in Arizona.

A perianal mass from a ten-year-old castrated male collie was identified as **apocrine gland carcinoma**. These are easily confused with perianal gland adenomas. It is quite useful to differentiate between the two types of tumors because the apocrine gland carcinoma is much more aggressive and invasive.

Malignant pheochromocytoma was diagnosed in a nine-year-old, spayed female, Standard poodle that died unexpectedly. The mass replaced the right adrenal gland and had invaded the lumen of the posterior vena cava. Numerous metastatic foci were found throughout the lungs. The cause of death was acute hemorrhage from the tumor resulting in "bleeding out" into the abdomen.

Renal dysplasia was the cause of progressive lethargy, inappetence, diarrhea and vomiting in a four-month-old, female Rottweiler. Antemortem chemistry values included a BUN of 301 mg/dl and creatinine of 20 mg/dl.

Canine herpesvirus infection was diagnosed in a nine-day-old Jack Russell terrier. Two pups from the same litter died with clinical signs of lethargy, vocalization, dyspnea, nasal discharge, and hyperthermia. The puppies became stuporous followed by coma and death within 24-36 hours of onset of signs. Gross lesions included petechial and ecchymotic hemorrhages in the kidneys and red, wet, firm lungs. The infection was confirmed by fluorescent antibody stains.

A seven-week-old Rottweiler puppy died unexpectedly at home. At necropsy, an **airway obstruction** was found caused by a piece of kibble dog food lodged in the larynx.

Pustular dermatitis and suppurative cellulitis caused by *Staphylococcus aureus* was the cause of severe, crusting

pustules and diffuse limb swelling in a litter of five-day-old, Doberman Pinscher puppies. The pustules were most commonly found in the inguinal area and inside of the rear legs.



Feline

Cardiomyopathy was diagnosed in a five-year-old male cat with a history of sudden death. The heart appeared somewhat elongated and the ventricles, particularly the left ventricle, had thickened walls. Microscopic lesions were minimal but there was some irregularity in myocardial fiber size and some of the fibers appeared disorganized. This should be considered as a possible cause of sudden death in middle aged cats.

Feline panleukopenia was the diagnosis in a seven-month-old, domestic shorthair cat which died following a history of anorexia, lethargy and vomiting. The cat came from a multi-cat household with frequent population changes.



Wildlife

Rabies was diagnosed in a grey fox from a rural area southwest of Tucson. The fox was described as "lethargic until persons got close then it was aggressive and tried to bite the individual." A dog accompanying the person attacked and killed the fox.

Hyperplastic dermatitis due to **chytrid fungi** was found in Lowland (*Rana yavapiensis*) and Chiricahua (*Rana chiricahuensis*) leopard frogs and a species of tree frog (*Hyla arenicolor*). The frogs came from a total of four sites in central and southeastern Arizona. These populations had experienced large scale die-offs of adult and subadult native frog species.

Canine distemper was diagnosed in an adult, female grey fox. The animal exhibited signs of weakness, ocular discharge and nasal discharge prior to death.

Impaction of the gizzard by olive pits was diagnosed in a feral pigeon from the Phoenix metropolitan area. According to the submitter, the bird was one of several seen in a yard that were anorectic, regurgitating, and losing weight. The droppings were bright green and very liquid. At necropsy, emaciation with extreme depletion of internal fat depots and prominent atrophy of the pectoral musculature were evident. Five large olive pits were impacted in the lumen of the gizzard. An additional finding was hemosiderosis of the liver (which contained 2292 ppm iron, normal <1000 ppm). Olive pit impaction associated with hemosiderosis of the liver has been diagnosed in feral pigeons from the Phoenix area in the past.

Elevated levels of iron (1562 ppm) and toxic levels of lead (10.3 ppm) were found in liver tissue from a mourn-

ing dove submitted for necropsy by a rehabilitation agency. No history was provided but at necropsy, the gizzard contents consisted of green-stained small seeds and pebbles. A few small seeds were found in the lumen of the crop. There was no other evidence of disease and the bird was in good flesh so presumably there was acute exposure (source unknown) to the toxicants.



Exotics

Dermatophilus congolensis was the cause of a disseminated, pyogranulomatous dermatitis in a club-tailed iguana. The skin lesions consisted of small, spherical, pustule-like solid masses composed of a keratin matrix with masses of septate, tapering filaments with lateral branches, with the morphology typical of *Dermatophilus*.

A **myeloproliferative disorder** was the cause of death of a three-year-old hedgehog. Extensive infiltration by neoplastic granulocytic marrow cells was found in the bone marrow, spleen, lymph nodes, liver, lung, kidneys, ovary and pancreas.

compiled by Greg Bradley, Robert Glock, T. H. Noon, Carlos Reggiardo

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

Ed Bicknell retirement

The UA Extension Veterinarian, Dr. Edward J. Bicknell, has retired effective December 31, 1998, after 26 years of service. Dr. Bicknell is a 1960 graduate of the College of Veterinary Medicine at Kansas State University. Following his graduation from veterinary school Dr. Bicknell entered graduate school at Michigan State University and was awarded the Ph.D. in Veterinary Pathology in December, 1965. Prior to coming to Arizona, Dr. Bicknell served on the faculties at Kansas State University, Iowa State University, and South Dakota State University. He once commented that upon arriving in Arizona to become the UA Extension veterinarian, "it was like I had come home". During his career, Dr. Bicknell served as president of the American Association of Veterinary Laboratory Diagnosticians, was active as a host in the Western Veterinary Conference and received appreciation awards from the U. S. Department of the Interior and the Phoenix Zoo for animal health service.

While at the University of Arizona, Dr. Bicknell participated in a wide variety of extension activities, as well as academic instruction and diagnostic service at the Arizona Veterinary Diagnostic Laboratory. As Extension Veterinarian he was well known for his field animal disease investigations and field research in bovine reproduction and swine herd health. His interests focused on diseases of

cattle, swine, and poultry, range plant poisoning and health problems of domestic species and wildlife. He also maintained a strong interest in companion animals. As extension veterinarian, he became known for his engaging style during presentations and workshops and developed a wide following around the state.

With his retirement the College of Agriculture, Cooperative Extension, the AzVDL and the veterinary, livestock, and wildlife communities will miss his versatility, competence, enthusiasm, personality and willingness to work out solutions to many types of animal health problems.

by T. H. Noon

Coccidioidomycosis

Coccidioidomycosis, known in lay terms as Valley Fever, is a fungal infection encountered commonly in dogs in Arizona. Diagnosis is most commonly made by serological testing alone. Serology tests currently in use include complement fixation (CF) and agar gel immunodiffusion. Improved diagnostic tests are needed for the diagnosis of coccidioidomycosis in dogs with vague symptoms, low or no antibody titers, and no obvious site of disease. Radiographs and biopsy with histopathology and/or culture are other tests that are very helpful for diagnosis of coccidioidomycosis in dogs.

From 1988-1998, 73 diagnoses of coccidioidomycosis were made in domestic dogs at AzVDL. Forty-seven were post-mortem exams and the remainder were biopsy or cytology specimens. The median age of cases was four years, and the range was three months to fourteen years. Interesting trends apparent in the data were the high number of deaths directly related to invasion of the heart or pericardial tissues (13/47) and the unexpected number of abscesses or draining tracts (14/73). Fourteen of 47 dogs died with coccidioidomycosis and intercurrent disease, and nineteen died of disseminated coccidioidomycosis alone.

Treatment of coccidioidomycosis in dogs has gone from none at all to the top of the line oral drugs available for humans. The first drug that became available was amphotericin B, a blessing for both humans and animals with fungal diseases. Amphotericin B remains the single best drug for treatment of pathogenic fungal infections. However it has drawbacks that include renal toxicity and IV only administration, which led to its falling out of favor with veterinarians as oral antifungal drugs came onto the market in the mid-eighties. Ketoconazole (Nizoral®) was the first of these and remains the backbone of coccidioidomycosis treatment in veterinary medicine. Recently, two more drugs, itraconazole (Sporanox®) and fluconazole (Diflucan®), became available for human use and have begun to increase in use in veterinary medicine. The drawback to these newer drugs is their high cost. They both have better efficacy and lower incidence of side-effects in human clinical trials. Diflucan® is the only drug proven to cross the blood-brain barrier and is the drug of choice for coccidioidal meningitis.

Efforts to develop a human vaccine are currently underway at the University of Arizona in conjunction with the VA Medical Center under the umbrella of the Valley Fever Center for Excellence (VFCE). It is hoped that a vaccine would also be available and efficacious for dogs. The Department of Veterinary Science and the VFCE are developing a canine coccidioidomycosis research program to look at the epidemiology of the disease and the possible relationships of soil and environment to the risk of infection, as well as studying the dissemination rate in dogs. In 1998, the VFCE added a section on coccidioidomycosis in dogs to their web site at www.arl.arizona.edu/vfce. For additional information, clarification or questions, e-mail Dr. Lisa Shubitiz at lfshubit@u.arizona.edu.

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Access to the AzVDL: Take Tucson Interstate 10 to the Miracle Mile exit #255. Travel approximately 1/4 mile on the south bound frontage road between Miracle Mile and Grant Rd. Turn west onto the farm at the signed entrance.

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