Animal Health Centre NEWSLETTER

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From The Chief Veterinarian

R. J. Lewis

We hear on a regular basis from various sources the importance of communication - with our friends and family as well as our work contacts, including colleagues and clients. In my opinion, there is no question that most of the problems that occur in any of our relationships can be traced to the lack of, inadequate, or poor communication. As we try to keep up with the demands of the workplace it is very easy to set aside communication as something that can be done after other tasks are finished. That is when problems start to develop or increase in magnitude.

It is no different, of course, at the AHC; it is essential that we routinely re-evaluate what we are doing and how we are communicating our results. When a significant disease is diagnosed in livestock, we make every effort to ensure the veterinarian and the producer are notified as quickly as possible. Another major group of stakeholders, however, are other individuals raising the same animals. Although it is necessary to get this information to these other stakeholders, if the disease in question is not federally or provincially-reportable, we have problems with confidentiality. The results of our studies belong to the submitter and/or owner and we take seriously our pledge to keep such results confidential. How then can we inform other animal owners of the occurrence of a new or serious disease?

In some situations we will send out a Disease Alert to the producer group and ask that they pass this information on to their membership. We do our best to be deliberately vague on the exact location of the problem in an attempt to protect the identity of the farm. One of the first questions we will often receive, of course, is: "Where is the problem occurring?" When we do not provide this information, we can be accused of being uncooperative. If we did release this information, we would be breaking confidentiality with our clients.

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TOLL FREE NUMBER AND WEB SITE: Please note that the Animal Health Centre has a toll free number: 1-800-661-9903. Keep this in mind if calling the Lab long distance. This Newsletter, and other information from the AHC, may also be found on the Internet at our web site: http://www/agf.gov.bc.ca.

Early this spring, we asked the various larger commodity groups if they would be willing to serve on the Animal Health Centre Advisory Council; one of the purposes being to improve communication between the AHC and the members of the organizations that we are serving. It was very encouraging that all groups contacted selected representatives to serve on this Advisory Council.

The following commodity groups each have a representative on the Advisory Council:

- B. C. Cattleman's Research Committee
- B. C. Pork Producer's Association
- Horse Industry Council of British Columbia
- B. C. Broiler Hatching Egg Producers
- B. C. Dairy Research Committee
- B. C. Salmon Farmer's Association
- B. C. Chicken Grower's Association
- B. C. Egg Producer's Association
- B. C. Turkey Producer's Association
- B. C. Veterinary Medical Association
- Specialized Livestock, BCMAF (sheep, llamas, alpacas, fallow deer, bison, reindeer, fur-bearers, rabbits)
- Director, Animal Industry Branch, BCMAF
- Chief Veterinarian, Animal Health Centre, BCMAF

Our first meeting was in late March and, although not all members were able to attend, it was a good beginning to what we hope will be a lasting relationship. One of the problems that we discussed was the difficulty in getting out important information to these groups. In many of the smaller commodities, not all producers are members of these associations and, thus, may not receive such information. Each representative at this meeting agreed to discuss with their association how we can better share information. As part of the AHC commitment to the Advisory Council, I have agreed to review AHC diagnoses and report on a quarterly basis to each representative who will pass this information on to their membership. We will also, of course, share diagnostic or other information with BCMAF commodity teams within the Animal Industry Branch.

I would welcome any suggestions on other ways in which the AHC may be able to further improve dialogue with animal industry.

"A portion of the 1998 graduating class of Animal Health Technologists from the University College of the Cariboo at Kamloops, together with their supervisor, Dr. Terry Lake (far right, back row) are shown above after recently completing a tour of the Animal Health Centre, at Abbotsford. Another group of AHT students from the Kamloops UCC, with their supervisor Dr. David Sedgman, had visited the AHC earlier."

Dr Stephen Raverty Assumes Role as AHC Diagnostic Pathologist:

Dr Stephen Raverty has recently been hired to replace Dr Robert Clugston, who retired earlier this year. Dr Raverty was born in Brisbane, Australia and raised in Vancouver, BC. While a high school and university student, Stephen was employed for week-end relief during the school year and full-time work over the summer months at the Vancouver Public Aquarium. His interactions with veterinarians and biologists at this facility, coupled with the opportunity to observe and closely work with exotic and indigenous species spurred his interest in comparative pathology. Stephen obtained a BSc in Zoology through UBC and after his first year of veterinary training, pursued an MSc in Aquatic Pathobiology at the Institute of Aquaculture, University of Stirling, Scotland. On resuming his veterinary studies, Stephen enrolled in a combined DVM, PhD program studying the pathology of bacterial kidney disease in Pacific and Atlantic salmon.

As a veterinary student, Stephen pursued a preceptorship in Aquatic Veterinary Medicine at the National Veterinary Institute, Oslo, Norway and successfully completed externships in the Department of Comparative Pathology, Johns Hopkins University, Department of Veterinary Pathology and Microbiology, University of California, Davis, and Department of Pathology, Animal Medical Center, Manhattan, NY and on completion of his training program, spent 1 year as a Post Doctoral Research Fellow studying channel catfish diseases at Mississippi State University and the Delta Research and Extension Center, Stoneville, MS. More recently, he completed a combined residency in zoo and companion animal pathology at the Department of Veterinary Pathology of the Animal Medical Center and the Wildlife Conservation Society, New York. Stephen is currently preparing for the specialty board exam in veterinary anatomic pathology.

With his additional training and expertise in fish diseases and in zoo animal pathology, Stephen offers our clients an extensive background of knowledge beyond the standard repertoire of large and small domestic animals. We welcome Dr. Raverty to our group, and look forward to his contributions as a diagnostic pathologist over the coming years.

Pullorum Disease on Vancouver Island:

Victoria Bowes

In early October, 1997, the owner of a small backyard chicken flock on Vancouver Island submitted dead chicks to a local practitioner with the complaint of poor hatchability and high early chick mortality accompanied by bloody diarrhea. No excessive mortality was noted in the adult hens (approximately 30 Rhode Island Reds). Tissues from the affected 5 day-old chicks were forwarded to the Animal Health Centre in Abbotsford for diagnostic work-up. The yolk sac contents were flocculent and foul-smelling, and the cecal pouches contained fibrinonecrotic cores. Histologically, there was an acute bacterial enteritis and yolk sacculitis. Both tissues yielded heavy ***Salmonella pullorum.***

The CFIA was immediately notified and a program of test and slaughter, with compensation, was initiated for all contact flocks. Over a period of 6 months, 115 flocks and 6700 birds were tested with the pullorum antigen plate test. All reactors were submitted for necropsy and confirmatory culture. The most rewarding tissue for

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Pullorum Disease on Vancouver Island: continued...

culturing was the ovary although liver, spleen and cecal tonsils were also cultured in selective media. In total, 7 flocks were confirmed positive for *Salmonella pullorum* and subsequently depopulated. The outbreak was confined to Vancouver Island and monitoring continues. No commercial poultry flocks were affected, but this outbreak serves as a strong reminder that backyard poultry flocks with less than optimal disease monitoring can serve as sources of infection for many economically significant diseases.

Salmonella pullorum is a federally reportable disease in Canada, along with *S. gallinarum* (fowl typhoid), highly pathogenic Avian Influenza (fowl plague) and velogenic Newcastle Disease. All these diseases are foreign or have been eradicated from Canada. Federally reportable diseases are the only ones with mandated test and slaughter, with compensation protocols to ensure eradication. Canada must maintain a *pullorum*-free status to maintain its poultry export markets.

Circovirus Infection in Pigeons:

S.A. Raverty

Five, 3 month-old pigeons were presented with a history of increased respiratory sounds and mortality. Aside from mild oral trichomoniasis in one bird and an ulcerative and erosive tracheitis in another specimen, no other lesions were apparent. Serology for *Mycoplasma* and Clearview test and culture for *Chlamydia spp* were negative, and no pathogens were isolated by aerobic culture of multiple tissues.

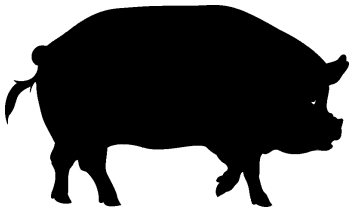
Significant histopathology of selected tissues from all five birds was limited to 1 of 2 examined bursas, which exhibited varying concentrations and numbers of follicular macrophages replete with botryoid inclusions. Based on morphology and location, these changes were compatible with pigeon circovirus infection.

Although circovirus-induced avian diseases, such as beak and feather disease virus (BFDV) and chicken anemia agent (CAA) are fairly well recognized clinically, pigeon infections with a closely related, but antigenically distinct virus have only recently been described (1990) and are poorly characterized pathologically. In outbreaks, birds typically present with nonspecific but persistent morbidity and mortality. As lymphoid tissue is a prime target for this virus, impaired immune response and secondary, opportunistic infections are considered harbingers of infection.

Currently, serologic or immunologic techniques for the diagnosis of this condition are not available. However, plans are underway to develop a more suitable, diagnostic protocol. In this case, additional birds will be necropsied, and secondary infections determined to facilitate intervention in the event of sudden, increased mortalities on the farm. In addition, tissues will be collected for molecular biology studies and electron microscopy, as well as cataloguing for future, prospective investigations.

At present, there are no treatments or vaccines available. Control entails maintaining optimal husbandry standards with restricted introduction of new birds, ensuring optimal environmental conditions, and continued monitoring for moribund or sick birds.

Pig Submissions:



Acute, severe fibrinoexudative and hemorrhagic **inflammation of the cecum (cecitis) with peri-cecal peritonitis** was diagnosed in a feeder pig that had been sent for slaughter. ***Salmonella typhimurium*** was isolated in heavy growth from the inflammed cecum, on bacterial culture**.**

Acute hemorrhagic enteropathy (rapid, fatal, bleeding into the intestine) was recently diagnosed in a 75 kg. feeder pig, with hemorrhage extending from the duodenum to the ileum. Other animals had died earlier, at the farm and may have had a similar condition, although those animals necropsied by the veterinary practitioner were described as having primary lesions of bronchopneumonia. The specific cause(s) of porcine hemorrhagic enteropathy is not known, although it has been speculated that some form of peracute reaction to a feed ingredient or compound , and/or perhaps intestinal mucosal injury from the proliferation of absorbed bacterial toxins in an ongoing dysbiosis (gut bacterial flora disharmony) is possible. Whatever the precise cause, the injury results in intestinal capillary dilation, congestion, rupture, and hemorrhage. In some cases, an increased incidence of the condition has been observed in pigs fed milk whey. Intestinal culture in the particular animal described in this case was unremarkable, yielding nonhemolytic *E. coli* and a light or scant growth of *C. perfringens*.

Severe, chronic, fibrosing gastric ulceration was diagnosed in a second pig from this same group, together with ongoing **bronchopneumonia**. Gastric ulceration in pigs is related to the fineness of the grind in hog feeds; pigs with chronic gastric ulcers tend to become anemic (due to blood loss from the ulcer) and immunosuppressed, rendering them suitable targets for opportunistic respiratory organisms circulating in their environment.

Cattle Submissions:

Mucosal disease enteritis due to **bovine virus diarrhea (BVD)** was diagnosed in two holstein short yearlings. Discrete, multiple erosions of the oral and esophageal mucosa were observed grossly on necropsy, together with diarrhea. Blood serology and cell culture of blood buffy coats from asymptomatic animals in this same group yielded another individual carrying **non-cpe BVD virus**,

In a group of 3 month-old calves with ongoing, chronic respiratory disease, ***Salmonella dublin*** was cultured from lung tissue specimens together with ***Pasteurella hemolytica*** and ***P. multocida***. Some of the changes seen within lung tissue suggested earlier viral involvement with ***BRSV*** virus and/or possible bovine mycoplasma, although neither of these groups of organisms was isolated or identified from tissues.

In another multiple submission consisting of 3 holstein calves **originally purchased from an auction mart**, respiratory disease complex (i.e., involving both bacterial and viral components) was again the principal diagnosis on gross and microscopic examination; ***P hemolytica*** and ***P multocida*** were cultured from lung tissue. No respiratory viruses were detected on tissues taken from the 3 calves despite microscopic evidence suggesting viral (BRSV or PI3) involvement; however, two animals were positive for **non-cpe BVD (bovine virus diarrhea) virus**. These calves were likely immunosuppressed, and less able to respond normally to respiratory pathogens. Thyroid tissue taken from all 3 calves was hyperactive, which usually indicates

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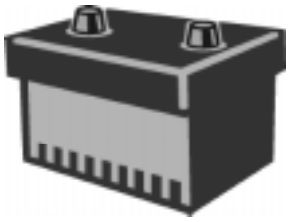
Cattle Submissions: (Continued…)

reduced amounts of the trace element iodine, either in their diet and/or in the ration of their dams. Calves or other young animals suffering from marginal to deficient levels of iodine tend to be less thrifty, and to respond poorly to infectious or other environmental stresses.

Hemophilus somnus was obtained in nearly pure culture from the stomach contents of an aborted holstein fetus of approximately 5 months gestation. Placenta from the fetus was severely inflamed, the reaction being both necrotizing and suppurative, together with a vasculitis. Numerous small gram negative coccobacilli consistent with *H somnus* were seen within placental tissue. Other changes seen in fetal tissues included a diffuse mild interstitial pneumonic reaction, and mild to moderate inflammation of the liver; there were no brain lesions observed microscopically. *H somnus* is usually associated with specific diseases of feedlot cattle, such as a severe brain infection (so-called I.T.E.M.E., or thromboembolic meningoencephalitis), and inflammation of the heart. Occasionally it is a cause of bovine abortion, as in this Lower Mainland milk cow. To date, no other cases of *H. somnus* abortion from this herd have been identified.

Get the lead out!

D. McIntosh



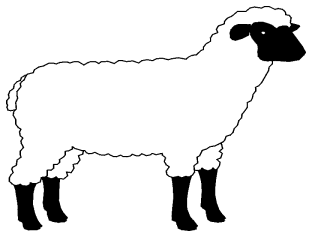
This spring a rancher in the central interior suffered a significant financial loss when eight of his best calves died because of acute lead poisoning. The source of the lead was a discarded old truck battery left in a pasture on which the cows and their calves were grazing. The first sign of trouble was finding a dead calf. Over the next few days several more calves died. One calf died while convulsing but the others showed no signs before death.

Lead toxicity is the most common poisoning in farm animals. Most cases occur in spring, or early summer, in calves less than six months of age. The source of lead is usually a discarded battery, but in some situations used crankcase oil or older lead-based paint is the incriminated source. During the winter discarded batteries will freeze, break open, and expose the lead plates. Young cattle are naturally curious and not very discriminating about what they taste. They will readily lick and chew the battery plates, which they find to be quite palatable. Calves are more susceptible to lead toxicity than adult cattle. It takes a smaller amount of lead to poison them and nursing calves more easily absorb lead into their system. It may be several days before the clinical signs appear. This is important when trying to determine the source of the lead. For example, if you have moved the cattle from one pasture to another shortly before they start to show signs of toxicity, it will be necessary to check both pastures to find the source.

To avoid this type of poisoning simply remove all potential sources of lead, such as old batteries, from the animal's environment.

Sheep submissions:

J. Coates



Chlamydial infectious abortion was diagnosed in a flock of ewes; microscopically, placentas examined showed severe necrosuppurative inflammation. The organism ***Chlamydia psittaci*** was identified by the rapid Clearview test, and by tissue culture, from placental tissue. Since completing this case, the AHC has acquired an immunohistochemistry test to further assist in the accurate diagnosis of this aborting agent.

In another case, a mature ewe was submitted for necropsy. The animal had died a few days after delivering a normal, healthy lamb. The ewe had severe necrotizing **mastitis** of the right mammary gland, with hemolytic ***Staphylococcus aureus*** being the significant agent detected on bacterial culture. Externally, there was extensive necrosis of most of the skin overlying the right udder and the right teat. It is likely that the single lamb was unable to completely drain the udder tissue of milk in the first few days after birth, leading to milk stagnation or pooling within the gland, and eventual secondary bacterial contamination. Hemolytic *Staph. aureus* produces a number of virulent toxins which cause cell necrosis, lysis of red blood cells, shock, and toxemia. Death may follow as in this case, when the systemic effects become fatal. One of the virulence factors or determinants of *Staph. aureus* is a capsular polysaccharide, which is antiphagocytic; that is, it impairs the ability of cell phagocytes to ingest and destroy the invading bacterial organisms (Gyles and Thoen, *Pathogenesis of Bacterial Infections in Animals*, 1993).

Equine submissions:

A purebred female Quarterhorse foal from the Lower Mainland was submitted for necropsy. The newborn animal had not been attended to by the owner at birth, but was found dead alongside the mare, a short time later. Placenta was submitted for examination, along with the foal.

There were no congenital anomalies observed on this nonviable term foal. Lungs floated in formalin solution, indicating the animal had breathed for a short while after expulsion from the mare. There were no other remarkable gross post mortem findings. On microscopy, the thyroids revealed severe follicular hyperplasia, with a marked absence of colloid in follicular lumens. Examination of placenta revealed very mild to mild, random, foci of placental degeneration and mineralization.

The thyroid changes are consistent with **thyroid hyperplasia, or goitre**, and are usually associated with deficiency of the trace element iodine in the dam's diet. Iodine deficient foals (or lambs, or kids, or calves) are often stillborn, or are nonviable, or unthrifty, neonates. Lung aeration is often poor or nonexistent. Iodine has a positive, promotant influence upon surfactant production in the term fetus's lung; animals deficient in this trace element can be expected to have poor lung inflation following birth. Previously, placental degeneration and mineralization has been noted by this writer in goitrous term calves on histopathology, but this type of placental change is not specific for iodine deficiency alone. This information was relayed back to the veterinary practitioner, who discussed the case with the owner.

Goat submissions:

Acute, severe, **suppurative meningitis,** caused by the bacterial organism ***Pasteurella hemolytica***, was diagnosed in a 7 week-old goat kid following a brief clinical illness of approximately 24 hours duration.

Wildlife submissions:

Four **raccoons** from different areas of Greater Vancouver were recently diagnosed with **canine distemper**, utilizing light microscopy, tissue culture combined with the fluorescent antibody procedure, and by PCR (polymerase chain reaction) technique. All specimens had viral encephalitis characterized by inflammatory change, tissue swelling, and eosinophilic inclusions within brain neurones. Cytoplasmic inclusions were readily observed within bronchiolar epithelium; all had some degree of pneumonia. Generally, inclusions were much more readily observed within bronchiolar epithelium than bladder epithelium. Structures resembling viral inclusions were also seen within squamous epithelium of the tongue, and mucosa of the stomach. Other observations in these yearling animals were the presence of ***Baylisascaris procyonis***, the raccoon roundworm, within the intestinal tract, and **lungworm** (suspect ***Crenosoma vulpis***) parasites within bronchi and alveoli.

Rabbit submissions:

Recent rabbit submissions continue to rotate primarily around intestinal disease, frequently associated with a **dysbiosis** of the gut flora, in which coliforms (gram negative organisms) tend to predominate. This type of condition leads to malabsorption, diarrhea, and proliferation of other organism that may initiate lesions such as **proliferative ileitis**, recently seen in a commercial rabbitry. **Coccidiosis** may also disrupt gut flora, leading to a predominance of gram negative organisms, while **rotavirus and coronavirus** may produce enteritis in nursing or weanling rabbits. In one recent rabbit submission, *Salmonella* group B, identified later as ***S. typhimurium*,** (also a coliform organism but with greater potential for mortality as well as morbidity) was isolated; this organism has zoonotic potential - that is, it is capable of spreading from animals to man. ***Yersinia pseudotuberculosis***, another potentially zoonotic bacterial organism, has also been isolated at the AHC from commercial fryers that demonstrated evidence of intestinal infection on necropsy inspection.

Sorting out the relative importance of various infectious agents or disease syndromes observed in any one rabbit submission can sometimes be a taxing process. Together with management factors such as sanitation practices, the potential for overcrowding, ventilation-respiratory disease, admixing of age groups, as well as dietary factors, it is quite apparent that the rabbit owner faces the same eternal animal health-management challenges as do other livestock producers.

In this respect, using the proven "all-in, all-out" approach in commercial rabbit operations is likely as beneficial as it is in other areas of livestock endeavor, where young animals of different age groups are segregated to prevent the generational transmission of disease from one group to another. All-in, all-out, operations also permit comprehensive cleaning and disinfection of pens and flooring between different batches of animals, thus disrupting the tendency of disease-producing microbes that remain viable within the cage environment to infect the newly introduced weanlings.

Canine submissions: Cardiomyopathy in a Doberman pinscher

A 9 year-old spayed female Doberman dog was submitted for necropsy following a brief episode of acute distress and death. The animal had undergone general anesthesia with halothane gas two or three days earlier, for teeth cleaning. The procedure had progressed uneventfully, and the dog appeared to have recovered normally from the procedure until its death a few days later.

Significant findings on post mortem were limited primarily to the heart. Although the heart/body weight ratio was within acceptable limits, there were frequent, multifocal to patchy areas of myofiber atrophy with interstitial fibrosis seen on microscopic examination, in both ventricles and the interventricular septum. Fatty infiltration of the myocardium, with displacement of functional tissue, was observed in all areas of the heart including the atria. Valve tissue was normal. Interstitial fibrosis was most prominent in the interventricular septum. There were also mild lymphoplasmacytic inflammatory infiltrates seen randomly within the myocardium that were seen in conjunction with injured or atrophied areas and arteriosclerosis of vessels was noted.

The clinical history and heart lesions seen in this animal are indicative of a diseased heart (cardiomyopathy). In this particular case, pre-existing heart myofiber injury - observed microscopically as myofiber atrophy and degeneration, combined with replacement fibrosis - likely pushed the heart into decompensation following the stresses of a general gaseous anesthetic. There is a dilated cardiomyopathy syndrome in the Doberman pinscher breed; however, changes observed in this animal did not follow the described lesions of this particular syndrome very closely.

Feline submissions: Gastric Ulceration and Hemorrhage in a Cat Associated with a Bacterial Organism Resembling Helicobacter sp.

S.A. Raverty

An adult cat from a local cattery was recently presented with a history of sudden, generalized weakness and lethargy. Clinical evaluation disclosed severe anemia (hematocrit of 9, total protein of 5.2 g/dl) , open mouth breathing, and a heart rate of 200 beats per minute. Despite the administration of oxygen, the cat died within 30 minutes.

The post mortem was conducted by the clinician and disclosed no apparent, gross external lesions. However, on examining the digestive tract, numerous erosions and ulcers of the stomach (mucosal) lining were apparent. Abundant, partially digested blood was observed in the lumen of the stomach and proximal small intestine.

Representative, formalin-fixed tissues were submitted to the AHC for histopathology. The most salient lesions were localized to the gastrointestinal tract which featured a chronic (lymphoplasmacytic) inflammation of the intestine and acute hemorrhage within the stomach. Due to the nature of the inflammatory infiltrate and observed erosions and ulcers in the stomach, special stains were requested. These stains revealed numerous, large, spiral bacteria that were either either free within the lumen of gastric glands, overlying and intimately associated with the superficial aspect of the stomach lining, or clustered within the apical cytoplasm of individual epithelial cells. Based on the post mortem findings and microscopic demonstration of helical organisms, a presumptive diagnosis of ***Helicobacter***-like induced ulcerative gastritis was made.

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Feline submissions: Gastric Ulceration and Hemorrhage in a Cat Associated with a Bacterial Organism Resembling Helicobacter sp. (Continued…)

This group of bacteria has been associated with chronic gastritis (inflammation of the stomach), lymphoplasmacytic enteritis, gastric and peptic ulceration, as well as gastric adenocarcinoma and lymphoma in a number of animal species including human beings, ferrets, domestic and exotic cats, lemurs (a non-human primate), dogs, mice, and more recently, pigs. The mechanisms and patterns of transmission within any of the above animal groups is poorly understood. However, due to observed case clustering, direct fecal-oral or oral-oral dissemination within species is considered the prime means of spread.

The precise role of this bacterial organism in the grossly noted gastric ulcers in this cat is difficult to resolve as *Helicobacter*-like organisms have recently been detected in the stomach lining of 90% of clinically normal cats, and 64% of cats with clinical signs referable to the gastrointestinal tract. Moreover, there is a lack of microscopically, detectable gastric ulcers within examined tissues. Nevertheless, attempts to obtain stomach biopsies from exposed cats for additional histopathologic evaluation and microbiology to isolate and further characterize this potential pathogen, are underway.

Cats have been demonstrated to harbor ***Helicobacter pyloric,*** the bacterium associated with human gastritis, and are a proven and valuable animal model of human infections. Although this organism may also pose a health risk for zoonotic transmission, recent investigations have demonstrated that the potential for human infections arising from cats is remote. An epizootiologic study has demonstrated that infection rates are lower within feral or wild cats than in animals maintained in family households, suggesting possible recruitment of the bacteria by cats from humans. There are still numerous question to further resolve this fascinating condition found in so many different animal species.

Respiratory distress and pyothorax in a Bengal cat:

J. Coates

An 11 month-old Bengal cat, in a state of collapse, was presented to a veterinary practitioner for examination. The animal had no accurate vaccination history. It exhibited rapid, shallow breathing, dilated pupils, and few reflexes. Despite a guarded prognosis by the practitioner, the animal was sent home, at the owner's request, with medical treatment. The animal died a few days later, and was submitted to the AHC by the practitioner, for necropsy.

Necropsy revealed collapsed, congested lungs, together with a large quantity of foul smelling brown-red fluid within the chest cavity. Inflammatory exudate was observed adherent to the thoracic and lung pleura, and to the pericardial sac. The thoracic fluid contained many small gray, mildly granular foci, which were visible grossly. This reaction did not extend into the abdominal cavity.

Microscopically, many inflammatory cells were seen migrating through the thickened and congested lung pleural membrane toward the pleural cavity, where there was pavementing of the pleura membrane with many inflammatory cells and proteinaceous exudate. Lung tissue per se revealed marked thickenening and hypercellularity of alveolar membranes, especially in subpleural areas.

The inflammatory exudate within the pleural cavity contained numerous bacterial colonies, which had an irregular, at times eosinophilic, core. Numerous gram positive

bacteria were seen within the central core, which were radiating outward, in a so-called 'Splendore -Hoepple' effect. The organisms had beaded, branching cytoplasm, and were acid-fast negative. The principal organism identified on anaerobic culture was an ***Actinomyces*** species. Unfortunately, speciation was not achieved in this case, although *Actinomyces sp.* identified from similar feline cases reported in the literature include *A. naslundi, A viscosus,* and *A israeli* (Gyles and Thoen, *Pathogenesis of Bacterial Infections in Animals,* 1993). Aerobic bacterial culture was negative.

There were no vascular or other lesions seen within the lung, heart, kidney, or other tissues elsewhere in the animal's body, that might have been linked to the coronavirus of Feline Infectious Peritonitis; no virus(es) was detected on tissue culture or electron microscopy; fungal cultures on lung and exudate were also negative.

Actinomyces species, particularly ***A. viscosus***, is the most frequently diagnosed cause of actinomycosis in dogs, a disease characterized by chronic granulomatous lesions. Abscesses may develop under the skin, in the submandibular region, or in the abdomen, but thoracic infections are most common. This same organism is also less frequently implicated in similar infections in cats, pigs, goats, cattle, and horses. *A. israelii,* a pathogen in humans, is only rarely a cause of disease in animals. Large animal practitioners will recall the lumpy jaw lesion in cattle caused by the related organism, *A. bovis*.

Trauma, or some other injury to host defenses, is evidently required to initiate or permit disease by these organisms. The lowering of oxygen perfusion levels in traumatized tissue undoubtedly facilitates growth of the bacteria. Frequently, other bacteria are recovered from lesions of *Actinomyces;* there is some evidence that accompanying gram-negative bacteria may facilitate development of the disease (Gyles and Thoen, 1993). In this case, no other organisms were detected. *Actinomyces* are not known to elaborate protein toxins, nor to have toxic cell wall components.

Fish news: Salmon Pox in two fresh water facilities:

S.A. Raverty and
*J. Constantine**

Whole, fresh, and formalin-fixed fish of 2 different age classes and sources were recently presented for evaluation. The first group was approximately 1 year old and was kept in net pens within a coastal lake. On routine grading and sorting, handlers had noted grey white discoloration (opacity) of the skin involving the dorsal fin and dorsolateral aspect of the trunk, in about 5-10% of the stock. The second group, of approximately 3 months age, had a history of increasing stock mortality with no apparent external lesions. These fish were obtained from a hatchery facility supplied by groundwater.

Microscopic examination of multiple sections of skin and dorsal fins from both groups disclosed mild to moderate thickening of the epidermis by up to 2-3 times normal, with accumulation of edema fluid (spongiosus) and widely, scattered, individual epithelial (Malphigian) cells with solitary, eosinophilic, cytoplasmic inclusions which peripherally displaced and compressed the nucleus of affected cells. In the older and to a much lesser extent younger stocks, there was moderate accumulation of inflammatory cells (lymphocytes and plasma cells) within the dermis of the affected areas. A tentative diagnosis of salmon pox was proposed.

Electron microscopy of skin smears from the affected sites of multiple fish from the yearling stock disclosed numerous retroviruses which confirmed the diagnosis of salmon pox.

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Fish news: Salmon Pox in two fresh water facilities (Continued…)

Salmon pox infections are noted sporadically within wild fish stocks throughout Europe and, more recently, the west coast of British Columbia. It is suspected that wild fish stocks were the primary source of infection in these cultured fish. There is an age-associated prevalence of this disease; over time, as seen within the year old stock, fish are able to mount an effective immune response and apparently ward off the infection.

From a management perspective, immediate concerns include the possibility of secondary or opportunistic, bacterial infections associated with disruption of normal epidermal defense barriers. Continued monitoring of fish for possible signs of septicemia, such as reddening at the base of fins, hemorrhage in the eyes, lack of appetite, is recommended. When necessary, application of appropriate antibiotics may be considered. More long term issues which have not been fully resolved, include possible recurrence of infection in maturing stocks associated with the physiologic stresses of smoltification (adaptations which allow the salmon to migrate from fresh to salt water) or sexual maturity, as well as grading or even harvesting for processing,which may result in potential marring of the external appearance of the fish and downgrading of the stock at the time of inspection. Fish are visually inspected at the time of processing, so any scarring incurred during the production cycle may affect the economic gain from the harvest of affected stocks.

Given that fresh water lake culture is limited and most fresh water hatcheries ozonate or treat their incoming water supply, aquaculture stocks are considered at low risk of salmon pox. Infections are generally a rare occurrence in British Columbia.

Efforts are underway by the extension, aquaculture veterinarian to monitor these affected stocks over time and to assess the possible economic impact of later recurrence of infection. Submissions to the AHC will be routinely monitored to assess the extent of infection within production stocks throughout the province.

**Aquaculture Veterinarian, Ministry of Agriculture and Food.*

Examination of red foxes (Vulpes vulpes) from Belgium for antibody to Neospora caninum and Toxoplasma gondii.:

" ***Neospora caninum*** and ***Toxoplasma gondii*** are closely related protozoan parasites.

…IgG antibody to *N caninum* was tested with an immunofluorescent antibody test (IFAT), validated by monitoring the serological response in a group of experimentally infected sheep before modifying it for use with fox sera…Twenty-one samples (17 %) had titres to *N caninum* greater than 1/64, with two at 1/1024 and one each at 1/2048, 1/4096, and 1/8192. All 12 juvenile foxes had titres of 1/64 or less. One hundred and twenty-one (98.4%) of the serum samples had antibody titres to *Toxoplasma* of 1/128 or more…

While this study shows that antibodies to *T gondii* detected with an IFAT are very common in foxes from the Belgian province of Luxembourg, it also shows that seroconversion to *N caninum* had occurred in a number of the animals studied. The proportion designated as positive depends on the titre selected as indicating the presence of specific antibody… Tizard and others (1976) have shown that 53% of

153 foxes and 84% of 96 foxes in Ontario, Canada, were infected with *T gondii*. The serological evidence also strongly suggests that there is no significant cross-reaction between the two tests…

The high seroprevalence to *T gondii* indicates the widespread occurrence of the parasite in the food supply of the foxes studied. While antibody to *Neospora* appears to be less common, a number of animals had encounters with the parasite with titres of 1/1024 and 1/8196 suggesting that these animals may have experienced recent infection. While the majority of foxes will have become infected with *T gondii* by ingesting small mammals and birds persistently infected with *T gondii* tissues cysts, the source of *Neospora* can only be speculated upon until its full life-cycle has been elucidated…

Neospora bradyzoites in tissue cysts have been shown to be resistant to HCL-pepsin solution, indicating that carnivorism may have a role to play in its life cycle (Dubey and Lindsay 1996). …If small vertebrates are involved, it is not certain whether the host is more restricted than for *Toxoplasma*, or whether infection occurs in a wide range of hosts but the incidence of infection is lower than for *T gondii*. Ingestion of bovine placenta infected with *N caninum* may also be a potential source of infection…

At present it is not known if *N caninum* can persist in the environment for any length of time like *T gondii*, where contamination of animals' drinking water with oocysts can act as a source of infection. Nor is it known whether the vertical transmission of *N caninum* as described in dogs (Dubey and Lindsay 1993) can occur in foxes… The results of this study strongly suggest that *N caninum* does infect wild foxes in Belgium…"

— Buxton D et al., *Veterinary Record* 1997; 141: 308-309.

Molecular diagnostics – new tests for Polymerase chain reaction (PCR) and Immunohistochemistry (IHS):

J. Robinson

Several new tests as well as improvements to some existing PCR diagnostic tests have been accomplished. We now have highly sensitive and accurate PCR's for the detection of ***Chlamydia psittaci***, for both mammals and birds. We also have a PCR method of typing ***Clostridium perfringens*** by differentiating the exotoxins the organism produces.

We have devised a much more rapid PCR technique for diagnosing TGE in swine, and also have new PCR tests for Canine parvovirus, feline parvo (panleukopenia), and Aleutian Disease parvovirus in mink. During the last several months we have been working on ***Neospora*** and Johne's disease in developing greatly enhanced PCR and DNA probe assays for these two pathogens. Although work is still ongoing, assays in terms of sensitivity have been improved 120 fold and 80 fold respectively for these two organisms.

Finally, we have greatly improved our test for ***Renibacterium salmoninarum*** and Viral Hemorrhagic Septicemia (VHS), and developed a new PCR for ***Piscirickettsia***, all of which are significant pathogens in farmed salmon.

We also have a new immunohistostaining method (IHS) for ***Coxiella burnetti***, which should greatly assist in diagnosing this organism, a cause of infectious abortion in goats and in sheep.

The Polymerase Chain Reaction technique (PCR): advantages and disadvantages:

The PCR technique is now used extensively (but not exclusively) at the Animal Health Centre (AHC) in the diagnosis of over 20 different infectious diseases in animals, including Leptospirosis, Malignant Catarrhal Fever, Johne's Disease, and porcine PRRS virus, to name a few. The technique has virtually revolutionized the laboratory diagnostic process, not only by allowing identification of heretofore difficult to isolate or culture organisms, but in the all-important aspect of turnaround time, thus providing more rapid solutions to diagnostic problems in the field.

The *advantages* of PCR are basically 3 in number:

1. Extreme sensitivity in pathogen detection.
2. Pathogen does not need to be viable, or capable of being cultured.
3. Can be used to detect pathogens in necrotic tissues, or in paraffin blocks of tissues.
4. Once amplified, it can be manipulated not only for its identification, but also for classification regarding its serotype, and genetic relationship to other pathogens in its group.

The *disadvantages* of PCR are:

1. The main disadvantage is the potential problem for contamination. Because the technique is so sensitive, precautions must be taken in completing PCR assays in designated PCR rooms, thereby avoiding micro-aerosol contamination during PCR amplification. Designated rooms require controlled air flow, assured positive air pressure, and have air filtration.
2. Technicians require a high degree of specialized training, and must utilize careful and faultless techniques, far beyond the normal sterile methods used in culturing viruses on cell cultures.
3. Inhibitors are sometimes present in feces, sputum, or possibly other body fluids or secretions, which completely inhibit the PCR reaction. Bile acids are thought to be the culprit in feces. This problem is being addressed, but in some instances such inhibition seems to completely prevent the PCR process from occurring.

Animal Health Monitoring Lab News:

Letitia Curley attended an Ottawa meeting June 7/8 of the CFIA (Canadian Food Inspection Agency) with labs accredited for EIA/EBL/Brucellosis testing, of which the Monitoring Lab is one. CFIA is proceeding towards full cost recovery for non-mandatory services and testing, and looking at cost recovery for mandatory services as well. By September, expect fees to be in place for CFIA services based on a rate of $75 per hour for their laboratory service and $60 per hour for provision of other services. These rates do not include transport or travel costs.

EIA-accredited veterinarians: please ensure that all parts of the Coggins test forms are filled out, including your code and the applicable CFIA district office code. For shows or sales within Canada, a multi-animal form can be used as long as tattoos can be listed. New forms should be available at the district offices. The one-animal form, complete with pattern and markings of the horse, must still be used for export purposes. (Also note, we can now test for EIA in horses being exported to Mexico.)

In August, AHML will be sending Lynn Hallwachs for official **EIA/EBL** training at the Retrovirology Centre of Expertise in Charlottetown, PEI. Because the reading of the AGID tests is subjective, in future two analysts will be required to read and sign each test result, which would allow neither of the currently certified staff to be absent! Each analyst is required to correctly interpret proficiency panels sent by CFIA throughout the year. In addition, the AHML is implementing internal quality check samples, such as we have in place for our ELISA testing.

CFIA is also moving towards shifting their animal health lab accreditation process to the Standards Council of Canada (ISO-25 standards). SCC fees to the laboratory are considerable and these would have to be eventually passed on to our clients. ISO standards are said to be necessary to maintain and improve agricultural trade, especially with Europe. The animal industries, through their national bodies, have been consulted and are reported to be in approval of the SCC route. Letitia would appreciate receiving your comments.

(The AHML has also been accredited by the American Association of Veterinary Lab Diagnosticians, AAVLD, as part of the Animal Health Centre.)

The AHML just dropped fees for **EIA** testing to $8.00/test, $6.75/test if 5 or more. However, more electronic data entry requirements from CFIA may result in this fee being raised again to compensate for the extra time required. **EBL** fees are $8.00/test, $3.50/test if 10 or more.

EBL: This spring, all accredited labs experienced unavailability of kits for CHAH herd testing. We have assurance that as soon as possible at least two suppliers will be certified for both EIA and EBL. Because ELISA testing is more sensitive and efficient this is being looked at, but requires agreement with other countries and A.I. centres as well as CFIA approval. There will also be improvements to the CHAH program itself aimed at higher participation.

Brucellosis: we will soon be authorized to test buffalo and llamas for export, as well as cattle.

Quality Assurance, cont'd: AHML recently ran a **PRRS** panel of 30 unknown sera prepared by the National Veterinary Services Laboratory, Ames, Iowa and sent to AAVLD accredited labs. Our results were excellent in both accuracy and precision. We have also completed sets of sera for *Mycoplasma gallisepticum* (MG) and *Mycoplasma synoviae* (MS) received from the University of Georgia and had good agreement with these as well.

Johne's Disease: The new IDEXX ELISA kit has proven to have increased sensitivity and can be used for both cattle and goat sera; the AGID test is still the recommended procedure for sheep. Cost for either method is $10/test or $6.75/test if there are 10 or more sera in a submission.

Further to ***M. Paratuberculosis,*** Letitia has had some success with culture. While still considered the most definitive method of diagnosis, isolation by culture is also the most difficult and very slow. There are two possibilities of decreasing the 16 week incubation period now needed and both are being investigated. If you would like to submit fecal, tissue or milk samples, please have them at AHML by Wednesday mornings. Fecals, at least 3 grams, need to be in a sterile sealable plastic bag (Whirlpak), or wide-mouth leak-proof container. Overnight delivery on cold packs is essential. Fresh samples will give the most meaningful results but if absolutely necessary frozen samples can be tested.

There are a few minor changes to our fee schedule. Call for details if necessary before you receive a new listing.

Neanderthal man:

"…modern humans and Neanderthals also shared many features: …They had brains as large as, and occasionally larger than, those of *Homo sapiens*, and there is no evidence that individuals were necessarily less gifted than their modern human counterparts. They had enough sense, skill, and organization to survive 200,000 bitter European winters, and held on in the continent long after most of the rest of the world succumbed to the passage of *Homo sapiens*…

…We have got to get rid of an idea, now deeply ingrained in our conscious, that because there is only one species of human being today, this has always been the case. For most of our evolution the opposite was probably true. There were at least two. Deeper in our past, there may have been even more. Think of that scene from *Star Wars* – in the bar where you see all kinds of aliens playing and drinking and talking together. I believe that image gives a better flavor of our evolutionary past…The two species were living in the same environment but were exploiting it in different ways. Neanderthals were using it in a more resource intensive way compared with modern humans. They were working harder, and at earlier ages, than modern humans because they used the environment differently…

…Because Neanderthals could not adjust to a changing world as well and as quickly as did *Homo sapiens*, it is popularly imagined that they must have been inferior and therefore must have been replaced by something "better"– i.e., modern humans. …Could stress the misleading nature of this vision. "Life is a copiously branching bush, continually pruned by the grim reaper of extinction, not a ladder of predictable progress".

…We should not be overcome with a sense of our own organizational superiority, however, for it is quite wrong to equate survivorship with some form of worth. Extinction is the inevitable destiny of all evolutionary lineages… Most (early primates) were evolutionary dead ends, because the demise of a species is the rule, not the exception, in biology, and we should not think that human beings are exempt from its harsh inevitability. …Time simply ran out for the Neanderthals – just as it will for *Homo sapiens* one day."

— Excerpts from *African Exodus*: *the Origins of Modern Humanity*, by Christopher Stringer and Robin McKie: Henry Holt & Co., New York, 1996.

Strange Empire:

"…The native defenders of the West in this period were for the most part Sioux, Cree and Blackfeet Indians and their "cousins", the Metis or "half-breeds". Their "empire" was the great mid-continent buffalo range now designated the Northern Great Plains; as the Indians doggedly retreated from it, the Metis and the whites moved in. But the Metis inherited all the Indians' problems while the whites gained strength and cunning…

…But history is impatient with intangibles: the mystic meaning of a shadow pattern on a sacred butte, or that of the order of wild geese in flight. It cannot pause to describe the roar of the black wind, the Plains chinook, which is a welcome sound; or the silence of the white cold, which is terrible. It cannot bother to reflect upon why some men, primitive and civilized alike, should believe that in personal contest or communion with the elemental fury of a blizzard, the loneliness of the prairie or the aloof majesty of an unclimbed mountain, they may chance upon the essential core of truth and meaning of life, revealed to them in an instant of intuitive experience as a reward for superhuman effort.

He died on the gallows and his nation died with him – his nation, and the dream of a strange empire in the West… History cannot avoid, however, a grudging acknowledgment that this odd nation could produce men with a bent for politics and war, and that one or two of them may even have been geniuses in those fields…"

— From *Strange Empire: the Story of Louis Riel,* by Joseph Kinsey Howard, published by Swan Publishing Co., Toronto, 1965.