Animal Health Monitor

Abbotsford Agricultural Centre
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In This Issue

Message from the Chief Veterinary Officer

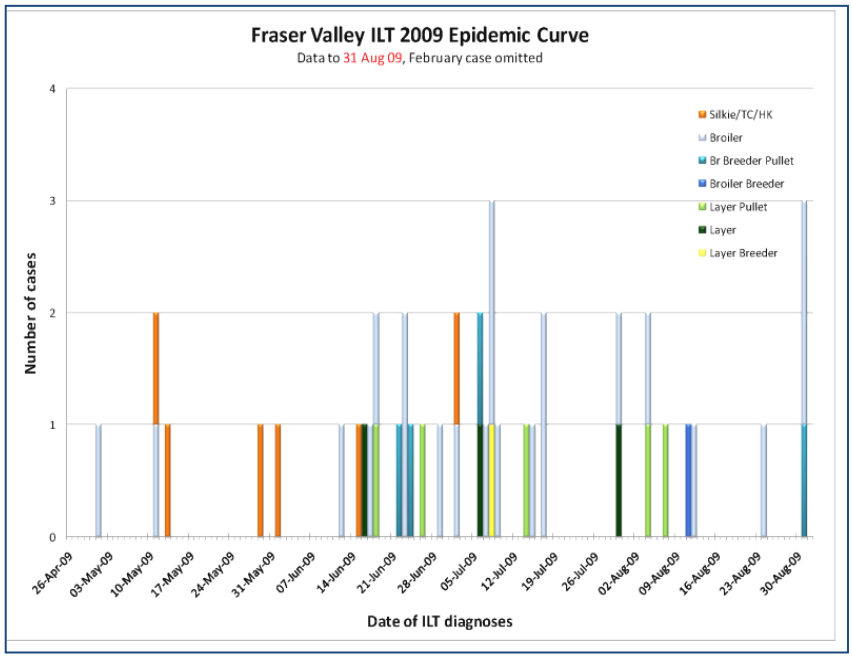
R.P. Kitching, Chief Veterinary Officer and Director, Animal Health Branch

Whether we are more sensitive to emerging health events, or whether they are simply becoming more common is not certain. The stream of public health emergencies including SARS, BSE, West Nile virus, Listeriosis, E.coli O157:H7 and salmonellosis must have left many people numb with expectation, and the current uncertainty about the best influenza vaccination program cannot have helped. But animal health has also been at risk, sometimes with the same human pathogens, either having greater consequences, as with the avian influenza and West Nile virus in horses, or less serious effects, as with the H1N1 in pigs. Anaplasmosis is a disease caused by a blood parasite transmitted by ticks. The bovine form is prevalent in US herds and only found sporadically in Canada, though it has recently been identified in the western provinces. Such diseases that are spread by insects whose distribution is influenced by environmental factors might be on the move, if what we hear about climate change is correct. WN virus is transmitted by certain species of mosquitoes, bluetongue virus is transmitted by Culicoides midges and there is always the possibility of more exotic insect transmitted viruses being introduced into North America as the opportunities present themselves. Maintaining good surveillance for animal disease events is essential if we are to respond quickly and efficiently, and keeping an open mind as to the possible cause is probably also a good idea.

Infectious Laryngotracheitis in Fraser Valley Poultry

On May 1, 2009, a case of Infectious Laryngotracheitis (ILT) in a flock of broiler chickens was reported. Over the next few weeks many additional cases were diagnosed leading to an epizootic that is ongoing as of mid Sept, 2009.

The graph below illustrates the occurrence of disease in several types of flocks over the summer. Between mid-June and mid-July there was large cluster of new cases, but other times during the outbreak period there are small clusters of cases separated by approximately 2-week intervals.



ILT is a Herpes virus infection of poultry that causes severe inflammation in the trachea of susceptible chickens. The damage caused to the lining of the trachea is significant and may result in high flock mortality, decreased feed consumption, and reduced growth or egg production. The most susceptible birds are broiler (or meat-type) chickens which are generally not vaccinated against ILT ILT does not infect people, and meat or eggs from affected flocks are safe for consumption.

A few cases of ILT have been documented in the Fraser Valley each year, with small outbreaks occurring in 2000, 2006, and 2007. This year's epizootic includes 48 farms diagnosed between May 1 and September 14, 2009. Infections have occurred on broiler, layer, breeder, and specialty meat bird farms.

ILT is readily transmissible among birds within a flock and between flocks. The virus is shed in exudates from the bird's eyes, nostrils, and throat and droplets can directly infect flockmates. Virus-packed droplets from infected birds also contaminate the barn, the manure, equipment and vehicles that contact the sick birds, and people handling those birds. Contaminated manure, equipment, and people are efficient vectors for the transmission of the virus to other farms. The contaminated environment can infect new birds that are brought on to the farm.

In this outbreak, the transmission of disease from farm to farm has likely been by wind and by environmental spread during the movement of infected birds or manure from an infected flock. Strong summer winds can carry virus-laden dust particles from the birds or the manure to flocks of susceptible birds. While the transport of birds is unavoidable, improper manure handling may be unnecessarily contributing to the spread of ILT.

Movement of the virus from farm to farm on people and equipment has been implicated in the spread of ILT. Improved biosecurity practices, including proper cleaning and disinfection of equipment, hands, boots, and clothing has helped to reduce the risk of spread.

There is preliminary laboratory evidence that the ILT virus circulating in Fraser Valley birds may be closely related to the live virus used in some of the ILT vaccines. If shown to be the case, this would corroborate work done during outbreaks in other countries that has also found a link between illness and vaccine virus. Further research into this hypothesis is being conducted at the Animal Health Centre.

The broiler chicken and specialty bird sectors have responded to the outbreak by implementing a specific ILT response protocol. The allied trades have shown their support by putting into practice various control measures. Control strategies focus on reducing the spread of the virus, reducing the amount of virus in the environment, and reducing the susceptible population of chickens.

Enhanced biosecurity measures on farms to reduce spread of ILT includes such practices as reducing movement of people and equipment from farm to farm, covering any manure during transport and avoiding spreading manure during windy weather, and transporting infected flocks via routes that avoid passing other poultry farms. Reduction of the virus in the environment is being achieved through heating manure to kill virus before transporting it and reducing the use of the type of vaccine that can cause disease. Finally, flocks in the affected area are being vaccinated to reduce their susceptibility to the disease.

The poultry industry, with assistance from the B.C. Ministry of Agriculture and private veterinarians, has organized a team to develop a long-term strategy to lower the likelihood of such an epizootic repeating itself.

Strangles in British Columbia – the disease, differential diagnosis, and summary of AHC laboratory results

Strangles is a bacterial infection of horses caused by the bacterium *Streptococcus equi subspecies equi* (*See*). This bacterium is NOT a normal inhabitant of the respiratory tract of horses and acts as a primary pathogen. As a primary pathogen, *See* does not need a predisposing viral infection, tissue damage or immune suppression to cause Strangles in exposed horses.

See is highly contagious. Horses become infected by 1) inhalation or ingestion of nasal secretions or draining lymph nodes of infected horses or 2) from infected barn surfaces, tack, equipment, grooming tools, horse blankets, etc in the horse's environment. Humans can transmit the bacteria from affected to unaffected horses on hands and clothing. Disinfectants such as povidone-iodine and chlorhexidine are effective if used according to directions.

Outbreaks of Strangles can occur as a result of spread from a symptomatic horse or from an asymptomatic carrier horse. Horses in the recovery stage of disease can shed bacteria for several weeks. Some horses without

symptoms are chronic carriers of *See*. Chronic carriers are reported to harbour the bacteria in the guttural pouch and/or paranasal sinuses for up to 3 years.

Generally horses 1 to 5 years of age are affected but horses of any age can contract the disease. Morbidity (clinically sick horses) can approach 100% in exposed, susceptible horses but mortality (dead horses) is low. Strangles causes fever, malaise, nasal discharge and in some cases a cough. The hallmark clinical sign of Strangles is swollen, abcessed, draining lymph nodes under the jaw and around the neck.

Once a clinical case is suspected, owners are advised to put the horse under quarantine and to take appropriate biosecurity measures to prevent spread of the bacteria to barnmates. A veterinarian should be called immediately to examine the horse and run tests to confirm the suspicion of Strangles. Quarantine of the entire facility is recommended to prevent spread of the organism off the premises to other barns or show arenas.

Animal Health Centre test results:
At the Animal Health Centre, all samples submitted for Strangles testing are analyzed by both bacterial culture and PCR to ensure that *See* will be identified even if present in very low numbers. From April 2007 to July 2009, the Animal Health Centre conducted 94 tests for *See*, the causative agent of Strangles. Results for *See* and a very closely related bacterium, *Streptococcus equi subspecies zooepidemicus* (SEZ) are shown below by year and reason for test: 1) horses with clinical signs of Strangles, 2) horses recovering after treatment for Strangles and 3) horses that were exposed to a confirmed or suspected Strangles case.

Animal Health Centre submissions, Strangles
April 2007 - July 2009

				Positive horses	
Year	Horses with Clinical signs	Horses Recovering	(Potentially) Exposed	***See***	SEZ
2007	8			**1**	1
		1		**0**	0
			18	**1***	1
2008	16			**4**	6
		3		**0**	0
			32^	**0**	4
2009	10			**2**	3
		0		**0**	0
			6**	**0**	2
Total	34	4	56	**8**	17

* One asymptomatic horse exposed to a barn mate with active clinical infection

^ One barn had 2 horses checked after exposure to culture confirmed horse

** Includes 2 horses in one barn with SEZ were post exposure checks - *See* culture of original infected horse was not done at AHC

Over the study period, *See* was identified by culture and/or PCR in a total of 7/94 (%) horses with clinical signs of Strangles. Of 56 horses tested after exposure to a known or suspect infected horse, only 1 horse was positive for *See*. All four of the recovering horses were free of *See* following treatment.

Over the study period, SEZ was cultured from a total of 9 horses with clinical signs of Strangles in the absence of other pathogens. In a 10th horse, SEZ was cultured and *See* was also identified by PCR indicating a co-infection. SEZ was recovered from a total of 7 horses checked for Strangles carrier status.

Differentiating Streptococcus equi subspecies zooepidemicus (SEZ) infection from true Strangles (*See*): In contrast to *See*, SEZ is a normal inhabitant of the upper respiratory tract of horses which can cause significant opportunistic disease when horses have another predisposing condition such as a viral infection, cancer, immune suppression or severe stress. SEZ can cause fever, inappetence, nasal discharge and cough in horses and look similar to Strangles in the early stages. However, SEZ does not cause lymph nodes to abscess. As you can see above, SEZ is commonly isolated from horses with signs of Strangles. SEZ is a very similar bacteria to the causative agent of Strangles (*See*) and specific biochemical procedures are required to differentiate the two on culture.

Why is this important? When a horse exhibits clinical signs of Strangles, horseowners are advised to quarantine their facility while tests are being conducted. If tests indicate SEZ infection, discussion with your veterinarian regarding immediate lifting of the quarantine is warranted. As stated above, SEZ is a normal inhabitant of the equine respiratory tract and is unlikely to be contagious to other horses as it is an opportunist. However, with opportunistic infections there can be initiating disease, such as a viral infection present, and your veterinarian can best advise when the quarantine may be lifted depending on the situation.

If you suspect Strangles, consult your veterinarian immediately.

Anaplasmosis in Cattle

Bovine Anaplasmosis is an infectious, but not contagious, tick-borne hemolytic disease of cattle that is caused by the rickettsia *Anaplasma marginale*. Only cattle and giraffes have been reported to have clinical disease when infected but other ruminants including bison, mule deer, goats and sheep can become persistently infected with *A. marginale*. *Anaplasmosis marginale* does NOT infect humans. Human Anaplasmosis is caused by *Anaplasma phagocytophilum*.

Erythrocytes (red blood cells) are the only known site of infection of *A. marginale* in cattle. Infected cells contain four to eight rickettsia within membrane bound inclusions. These are visible on a blood smear stained with a Giemsa, Wrights or Diff-Quick® stain. During the acute infection, 70% or more of erythrocytes in susceptible adult cattle will be infected.

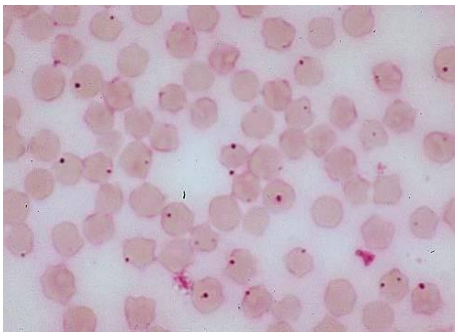


Figure 1. *Anaplasma marginale* infecting bovine erythrocytes in a stained smear.

Disease develops 7-60 days after cattle have been bitten by an infected tick. Clinical signs may include fever, weight loss, abortion, lethargy, icterus and often death in animals older than 2 years. Calves are less susceptible to clinical disease, but they may become persistent carriers for life. This phenomenon is not well understood.

- Cattle less than 6 months old rarely have clinical signs

- Cattle 6 to 12 months old usually only have mild clinical signs
- Cattle 1 to 2 years old have acute but rarely fatal disease
- Cattle over 2 years old have acute and often fatal disease presenting with pale mucous membranes, anorexia, exercise intolerance, dyspnea or sudden death
- Carrier state is clinically unapparent and not normally detectable on blood smears

Within North America, transmission of *A. marginale* has been demonstrated by the 3 host ticks, *Dermacentor andersoni*, *Dermacentor variabilis,* (Rocky Mountain Spotted tick and American Dog tick), and the one host tick *Dermacentor albipictus* (Moose or Winter tick). Animals that survive the acute phase become persistent carriers and are resistant to clinical disease but are a reservoir for mechanical transmission through biting flies, shared needles, and surgical equipment, and biological transmission by ticks. Transmission by ticks and flies occurs in the summer months beginning around May 1st and continuing until temperatures are consistently below freezing. Transplacental transmission has also been reported.

Treatment with tetracycline will eliminate clinical signs but WILL NOT clear the organism; animals remain persistently infected carriers despite treatment. In Canada, there is no licensed vaccine for Anaplasmosis.

Anaplasmosis is endemic in the United States, and most tropical, subtropical and even temperate countries including Mexico, Central and South America, and the Caribbean. Canada has remained essentially Anaplasmosis free and the disease is reportable under the Federal Health of Animals Regulations. All cases must be reported to the Canadian Food Inspection Agency (CFIA).

Pathological lesions of Anaplasmosis

- Pale mucous membranes
- Thin watery blood with jaundice
- Enlarged, soft spleen with prominent follicles
- Hepatomegaly with yellow-orange discoloration
- Gall-bladder distension with thick green-brown bile
- Brown hepatic and mediastinal lymph nodes
- Epicardial and pericardial petecchia and ecchymoses
- NO HEMOGLOBINURIA (the destruction of the erythrocytes occurs intracellular rather than intravascular)
- PVC can be very low

Laboratory Samples for Diagnosing Anaplasmosis

- Whole blood in EDTA or heparin tubes
- Serum for cELISA the diagnostic test carried out at the CFIA Lethbridge Laboratory
- Fresh and fixed tissues as appropriate for differential diagnosis

Differential Diagnosis for Anaplasmosis

- Bacillary hemoglobinuria
- Chronic copper toxicity
- Any cause of hemolytic anemia (onion poisoning, post parturient hemoglobinuria)
- Leptospirosis
- Grazing *Brassica* sp. (canola, kale, turnips, cabbage)
- Eperythrozoonosis
- Babesiosis

If Anaplasmosis is suspected or confirmed, the CFIA must be notified. Provincial authorities may also be contacted. Further information can be found at:
http://www.inspection.gc.ca/english/anima/heasan/disemala/anaplasmos/anaplase.shtml

Necropsy on a pier

On July 25, 2009 a dead 35 tonne fin whale arrived in Vancouver on the bow of a cruise liner. The ship had left port in Alaska 72 hours earlier. A necropsy was performed and tissues were analyzed at the Animal Health Centre. The animal was in very poor post mortem and body (nutritional) condition. There was extensive post mortem decomposition and bacterial overgrowth due to putrefaction. Gross and microscopic evaluation of skin and skeletal muscle at the impact site did not reveal any bleeding or bruising, indicating that the animal was dead at the time of impact with the vessel.

Over the course of the last 10 years, the Animal Health Centre has been involved with diagnostic support for more than 10 fin whales and this is believed to be the first animal to present in poor body condition (emaciated). Virtually all of the whales presented with evidence of boat interactions/trauma.

Due to the degree of emaciation, the role of malnutrition in this animals death cannot be discounted; however, with putrefaction and lack of apparent gross lesions within the examined internal organs, a specific cause of malnutrition was not determined.

Recent publications have implicated climate change and potential alterations in prey dispersal patterns in contributing to malnutrition and starvation in whales. To further assess the overall health and nutritional status of whale populations, future surveys may include efforts to document whales that appear malnourished.

A case from the Post Mortem Room

An 8 year old female lactating goat was submitted for necropsy to the Animal Health Centre. The history was unthriftiness for approximately 6 weeks, variable appetite, and soft feces initially which now were normal. Necropsy revealed variable skeletal muscle atrophy with adequate mesenteric body fat. The mesenteric lymph nodes, especially the ileocecal lymph node, were moderately enlarged. The wall of the ileum was mildly thickened. Microscopically there was a lymphogranulomatous inflammation in the lamina propria of the intestine. Ziehl-Neelsen Stain revealed large numbers of acid fast bacilli within the cytoplasm of macrophages.

Paratuberculosis (Johne's Disease) is caused by *Mycobacterium avium subsp. paratuberculosis* infection. Johne's disease is most common in domestic ruminants but it also can occur in free-ranging and captive wild ruminants and occasionally in non-ruminant species.

Johne's disease in goats expresses itself differently than in cattle in that diarrhea, which is the most common sign in cattle, is an uncommon finding in goats. The pathological findings in the intestine are more subtle than those seen in cattle where there is often prominent accordion-like corrugated thickening of the intestinal mucosa and wall. There may be caseation of the lymph nodes which must be differentiated from tuberculosis. In goats the body condition may be poor but the persistence of adequate mesenteric fat is not unusual.

Similar to cattle, goats are infected by the fecal-oral route with the organism shed in the manure of infected adults and ingested by susceptible young animals. This is particularly the case where animals are overcrowded and sanitation is poor. Neonates are considered to be the most susceptible to infection and there likely is an age-related resistance. It is probable, however, that even adult animals can be infected if kept in overcrowded, heavily contaminated environmental conditions. Infected neonatal goats carry the infection in a dormant state in the intestine and lymph nodes for a variable period of time into adulthood where some ill defined factors such as stress or another illness precipitates the proliferation of the organism and subsequent clinical signs. Especially noticeable is the progressive weight loss without diarrhea. Because of the prolonged dormancy infection, the persistence of the organism in the environment, and the endemic nature of the disease, all goats in an infected herd must be considered at risk of infection.

Mystery swabs; What's this tissue?

Every veterinarian and producer knows the importance of basic information such as an animal type, age, stage-of-production, location, and clinical history. At the Animal Health Centre, this information is vital to microbiologists and pathologists as they select and interpret tests and examine tissues. It is also essential to our recordkeeping and disease monitoring.

The problem is that too often we don't have enough information to work with.

Here are 3 good reasons for a veterinarian or producer to ensure that **all animal demographic and case-history information is clearly recorded on laboratory submission forms**:

- complete information helps laboratory diagnosticians provide better service
- complete information 'counts' towards surveillance in support of the industry and private veterinarians, and
- complete information ensures the existence of accurate off-site medical records for the submitting veterinarian.

In the News

West Nile Virus Confirmed for the First Time in Horses in British Columbia

September 11, 2009

VANCOUVER – British Columbia has confirmed its first locally acquired case of West Nile virus in horses. This closely follows the confirmation of the first human cases, further indicating the presence of West Nile virus in the province.

The provincial Animal Health Centre has confirmed that a horse in the Fraser Valley and a horse in the South Okanagan of the Interior Health region have been infected with West Nile virus. Test results are pending on another horse in the South Okanagan. None of these animals have traveled outside the province. In 2006, a horse that had traveled to Colorado was infected with West Nile virus before returning to B.C.

"This is not a surprising development," said Dr. Paul Kitching, Chief Veterinarian and Branch Director at the Animal Health Centre. "British Columbia has long anticipated the arrival of West Nile virus, and now it's in multiple regions of the province. What is important is preventing infection as best as possible, for both humans and animals. Of all large land mammals, horses are particularly susceptible. There are West Nile virus vaccines for horses, and horse owners should talk to their vets about getting their animals immunized."

West Nile virus is a mosquito borne illness. Mosquitoes become infected with the virus after feeding on infected wild birds and then transmit the virus through bites to people, animals and other birds. Some animals infected with West Nile virus may show no signs. Others may exhibit a range of symptoms including fever, muscle spasms, weakness, lack of coordination, seizures and changes in behavior. For horses, signs of West Nile virus infection may include stumbling, weakness, head pressing, confusion, inability to stand, seizures and listlessness. Most horses recover fully. In severe cases, horses may die or need to be euthanized.

Most people who are infected with West Nile virus will have no symptoms at all. However, about 20 percent of people infected will develop an illness with fever, headache and rash symptoms. In about 1 in 150 human cases, more severe neurological complications can occur, such as encephalitis (inflammation of the brain) and meningitis (infection of the lining of the brain).

West Nile virus cannot be transmitted from an infected horse to humans. Horses that have been infected are not a risk to other horses in the area. However cases in horses signal that infected mosquitoes are present in the area, which indicates a risk to other horses and people in the vicinity.

In addition to getting their animals vaccinated, horse owners should make an effort to drain standing water where mosquitoes may breed and practice mosquito control in general.

This edition of the Animal Health Monitor was written and edited by: Paul Kitching, Mira Leslie, Bill Cox, Ann Britton, Jane Pritchard, Stephen Raverty, Don McIntosh

We are always pleased to receive feedback from our readers. Suggestions on future topics and potential contributions are encouraged. You can find past and current issues of these newsletters on our website: http://www.agf.gov.bc.ca/ahc/ahcwho.htm

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