Animal Health Monitor

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Ministry of Agriculture, Food and Fisheries

Mission Statement: To provide our clients with important information regarding the work being done by the Animal Health Centre and Regulatory Unit, as well as events and issues relevant to animal health in BC.

Editorial by Dr. Tomy Joseph,
Acting Director, Animal Health Centre

Welcome to the first issue of the Animal Health Monitor in 2022!

I hope this newsletter finds you all well at the start of the new year. There is no doubt that 2021 has been a challenging year for all of us especially because of the significant losses to the agriculture sector caused by extreme weather events in B.C. The flooding in November 2021 also caused substantial damage to the Animal Health Centre (AHC) and the AHC remains closed.

Looking ahead to 2022, you may be wondering about the status of the AHC and the services we offer. Although we are not able to provide any timelines for the reopening of the AHC right now, we can assure you every effort is being made to resume laboratory services at the AHC as soon as possible. In the meantime, we are trying to assist you by providing important information on animal disease concerns and diagnostic solutions through our newsletters, email updates and consultation services.

This issue of the Animal Health Monitor covers a variety of topics including interesting and important animal disease diagnoses performed at the AHC and various aspects of animal health concerns caused by recent flooding. Excessive rainfall and flooding can contribute to widespread animal health issues including infectious and non-infectious diseases that can lead to serious impacts on livestock farming. I believe you will find the information in this newsletter helpful as we continue to navigate the impacts of the damages caused by extreme weather events in B.C. recently.

Although we are not able to provide any disease diagnostic testing services right now, our staff are here to help you in any way we can. Please contact us by phone 604-556-3003 or email: pahb@gov.bc.ca, if you have questions or visit our website (www.gov.bc.ca/animalhealthcentre) for more information.

We hope our newsletters will keep you informed and help you stay connected to us.

Wishing you all a happy, safe and prosperous new year!

All authors are employees of the Ministry of Agriculture, Food & Fisheries unless otherwise noted.

To subscribe to the Animal Health Monitor, contact: Julie Hughes by "CTRL" clicking mariejulie.hughes@gov.bc.ca

Premises Identification (ID) Registration to Become Mandatory in B.C.

Lisa Levesque (Team Lead, Traceability and Premises ID)

In the summer of 2022, B.C. will become the 6th provincial jurisdiction in Canada [i] to implement a mandatory premises identification (ID) program. As one of the three pillars of Canada's livestock identification and traceability system (TRACE) established in 2006, premises ID is an important source of information linking farm animals to specific geographic locations which enhances the Province's ability to respond quickly and effectively to animal health and natural disaster emergencies.

B.C. has had a voluntary premises ID program in place since 2011. While registration rates have been steadily increasing since the program's inception, only an estimated 70%[ii] of premises have been registered to date with a dramatically lower registration rate for some animal types and commingling sites[iii]. Premises ID information gaps can limit the ability of governments and industry to respond effectively to emergencies affecting animals.

Several industry organizations in B.C. have proactively moved to close this information gap, requiring premises ID registration for all regulated members (i.e., commercial poultry, dairy and pork producers). This effort proved to be instrumental in limiting the impact of B.C.'s 2014-15 Avian Influenza outbreak on B.C.'s poultry industry, dramatically reducing animal deaths and enabling unaffected businesses to continue operating.

Premises ID information has also more recently become a critical tool for supporting natural disaster emergency response and mitigating impacts to farms and other livestock operations. During the devastating wildfires in 2017, 2018 and 2021, premises ID information was used to locate animals, notify and communicate with operators, estimate animal numbers for evacuation planning, and facilitate the re-entry process for owners and site operators in some affected areas - efforts that significantly reduced animal deaths resulting from those events.

Under the new regulation, all animal owners and commingling site operators (e.g., veterinary clinics, abattoirs, fairgrounds) with one or more animals in their care will be required to register at least one premises where these animals are regularly kept, assembled, handled or disposed of. Registration is free and takes less than 15 minutes online. For a full list of animals that will need to be registered, visit the premises ID website.

As recent global events have so dramatically highlighted, disease outbreaks and natural disaster emergencies are unpredictable and undiscerning with the potential for devastating impacts. Premises ID is one simple step that animal owners can take to prepare for emergencies and contribute to successful emergency response.

To sign up for a premises ID or to find more details about the proposed regulation, please visit the Premises ID Program website: http://gov.bc.ca/premisesidprogram.

Register today!

√ ***Protect your animals***
√ ***Build your emergency management toolbox***
√ ***Be a good neighbour***

http://gov.bc.ca/premisesidprogram

[i] Premises ID registration is mandatory in Alberta, Saskatchewan, Manitoba, P.E.I. and Quebec.

[ii] Estimate is based on 2016 agricultural census data and is considered to significantly underestimate the number of unregistered premises in the Province, particularly small, backyard producers.

[iii] A commingling site is a location where animals from different owners are kept together, either temporarily or permanently.

Post-Mortem Neurological Examination

Kristen Moffitt (Necropsy Technician)

Though regular post-mortem examinations include gross and histological examination of the brain, they do not include an examination of the spinal cord—that is an "add-on" option.

Why are spinal assessments not included? Pulling the spinal cord from any animal is strenuous, time consuming and often unnecessary for most diagnoses. The number of slides needed to adequately assess the spinal cord under the microscope is often greater than the number of slides needed in an average necropsy case. For this reason, it costs an additional $100 to add this service onto a regular post-mortem examination.

So, when is a full examination of the spinal cord warranted? When the animal has clinical signs of a neurological disease that is localized to the spinal cord. Common examples may include ataxia or paralysis / paresis of the hind end or forelimbs or when the patient has clinical signs that can be localized to the brain, which may include seizures, a head tilt, nystagmus and/or circling, then examination of the brain is usually sufficient.

Like all cases, please try to submit animals *as fresh as possible*. If the carcass is autolyzed or has been frozen and thawed, it can be difficult to remove the spinal cord due to the change in the consistency of the tissues. More importantly, the spinal cord autolyzes quickly, especially in a horse. In the case of an equine neurological examination, the necropsy must be conducted the same day as the animal is euthanized to achieve an effective review of spinal pathology. In some cases, this will mean holding off on euthanasia until you know the animal can be brought in for a post-mortem that same day.

If you are ever unsure whether to check the "Neurologic Examination (Spinal Cord)" box or not, then please call our front office. They will put you through to the pathologist on duty who will advise you and be happy to answer any questions.

Renal Tubulonephritis with Microabscessation in a 3 day old Veal Calf

Stephen Raverty (Veterinary Pathologist)

A local producer recently sought veterinary advice for a 3 day old female veal calf with tachypnea and increasing respiratory distress. A tentative diagnosis of pneumonia with possible sepsis was made and the animal was started on treatment on day 2 with intramuscular gentamicin and bicarbonate. Due to rapid deterioration and a failure to respond, the calf was humanely euthanized the following day.

The calf was 50 kg and in moderate body condition. The mucus membranes and internal serosa were pale white (presumptive anemia) and there was abundant serosanguinous hydrothorax and ascites. The caudal third of both lungs were atelectatic, there were multifocal abomasal erosions and ulcerations with diffuse submucosal edema. The abomasum contained a small amount of bright yellow white milk clots. Segments of the small intestine and colon had prominent transmural edema and flocculant yellow-red fetid contents. The most significant findings were subcapsular renal petechiae and ecchymoses, which on cut surface extended deep into the underlying parenchyma. Representative tissues were collected for routine microbiology and special Salmonella spp culture and post mortem heart blood for bovine IgG quantification by radioimmunodiffusion.

Immediately below and dissecting the subcapsular interstitium and randomly throughout the kidney, there were focally disseminated interstitial, intratubular and to a much lesser extent, intravascular accumulations of neutrophils frequently bound by lymphohistiocytic infiltrates which in the cortex, effaced and peripherally entrapped renal tubules and glomeruli. Involved tubules featured atrophic, degenerate, necrotic and occasionally regenerative tubular epithelia (Figure 1). In addition, there were multiple dilated and occasionally haphazardly aligned renal tubules with attenuated tubular epithelia that were empty or contain refractile proteinaceous casts, coarsely granular mineralized deposits, or dense accumulations of degenerate neutrophils, necrotic and exfoliated renal tubular epithelia and occasional eosinophilic necrotic debris. In sections of abomasum, there was moderate diffuse submucosal edema with multifocal superficial erosions and ulcerations with abrupt margins and central nodular accumulations of degenerate and necrotic neutrophils bound by lymphohistiocytic infiltrates that merge with granulation tissue (Figures 2a and 2b). Similar changes were noted in the small intestine and colon with multifocal

Renal Tubulonephritis with Microabscessation in a 3 day old Veal Calf cont'd

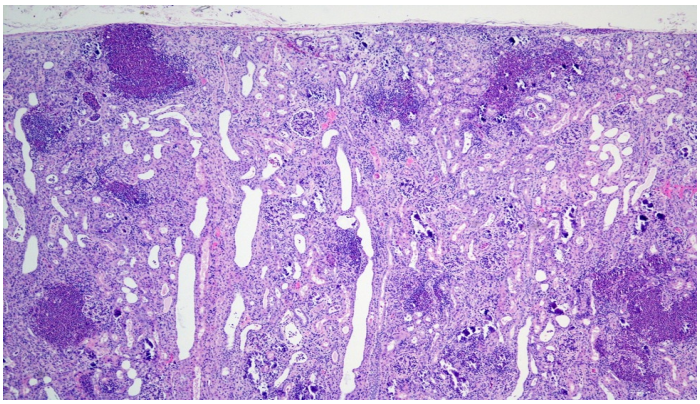
Stephen Raverty (Veterinary Pathologist)

crypt abscessation and GALT lymphoid depletion. Sections of the caudal lung lobes feature variable atelectasis with scattered fibrinosuppurative bronchopneumonia.

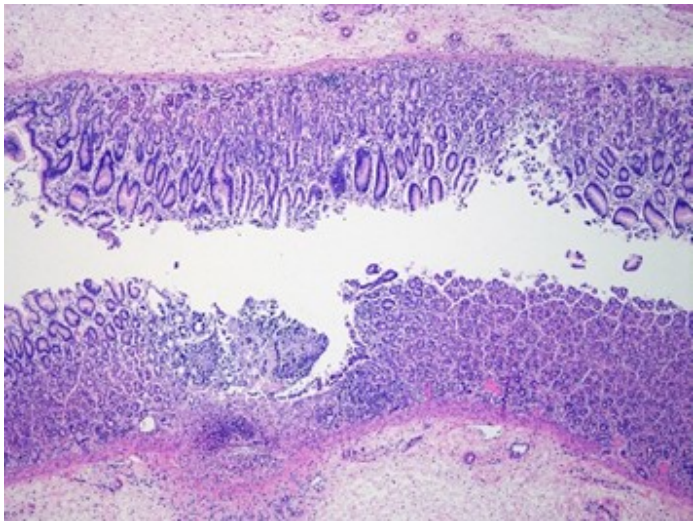
Aerobic culture of the lung and spleen yielded a few to light mixed growth of Corynebacterium sp, Staphylococcus spp, Alcaligenes faecalis with a few Escherichia coli recovered from the spleen and kidney. There was heavy growth of E coli from the abomasum, small intestine, and colon and follow up bovine toxin typing was negative for E coli F41, E coli intimin, E coli K99, E coli Sta, E coli Stx-1 or E coli Stx-2. No Salmonella spp were cultured from the colon, small intestine, lung, spleen or abomasum and radioimmunodiffusion of post mortem fetal heart blood detected 580 mg/100 ml, with normal 24 hour post colostral reference range above 755 mg/100 ml.

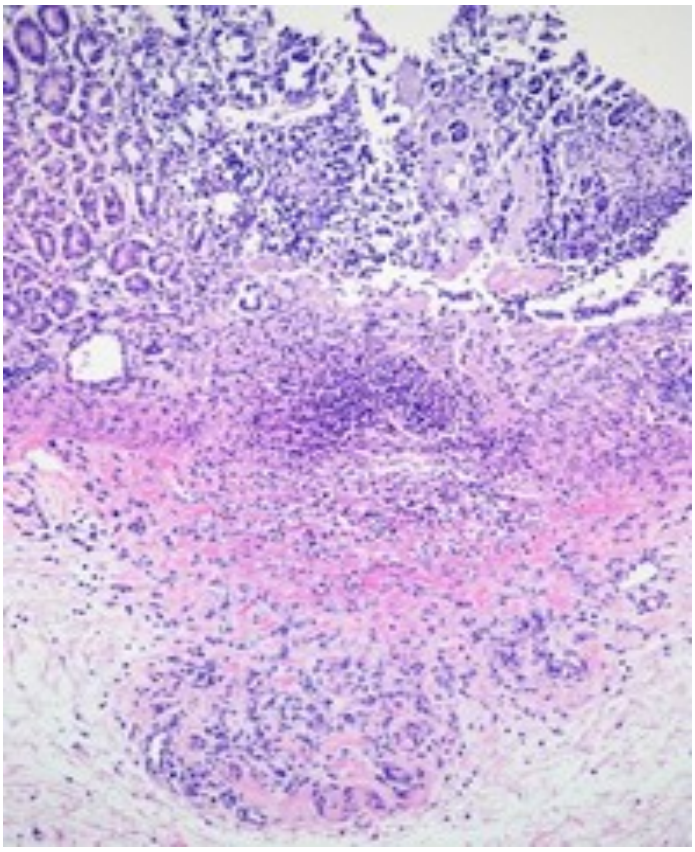
The cause of death of this calf was attributed to the cumulative effects of the suppurative tubulonephritis, ulcerative and erosive abomasitis and enterocolitis, fibrinosuppurative bronchopneumonia, presumptive anemia, hydrothorax and ascites. In this case, impaired renal function may have been sufficiently severe to have resulted in the fluid accumulation in the chest and abdomen. In addition, the lack of colostral consumption suggests hypoproteinemia and hypogammaglobulinemia, which may have predisposed and possibly exacerbated the infection. In young calves, Escherichia coli is commonly associated with this type of lesion, but Salmonella spp, Leptospira sp and other opportunists may be recovered from infected tissues. To avoid secondary to opportunistic infections in perinatal calves, it is important to ensure that adequate colostral consumption is achieved.

Figure 1. Low power photomicrograph of the affected kidney. Note the disseminated abscesses with multifocal intratubular mineral precipitate.



Figures 2a and 2b. Throughout the abomasal mucosa, there are scattered erosions and ulcers with prominent submucosal edema. In figure 2b, the image is a higher magnification of an ulcer with central abscessation, peripheral granulomatous infiltrates and subtending granulation tissue.





Equine Multinodular Pulmonary Fibrosis and Hilar Lymphadenopathy with Detection of an Unusual Pathogen in a 14-year-old Thoroughbred Gelding

Stephen Raverty (Veterinary Pathologist)

A 14-year-old 550 kg Thoroughbred recently presented to the Animal Health Center (AHC) for post mortem examination. The gelding had a history of persistent mucoid nasal discharge, tachycardia, tachypnea, increased respiratory effort, lethargy, emaciation, and fever. The animal had been fed hay, a commercial concentrate, was on pasture and had been vaccinated for tetanus, EHV 1 and 4 and EIV. Initial clinical pathology disclosed increased serum amyloid A, hyperfibrinogenemia, and neutrophilia. Despite repeat treatments with a variety of antimicrobials, denbuterol and flunixin, the horse remained dyspneic, febrile, cachexic, and was humanely euthanized. Prime differentials included pulmonary abscessation, pulmonary mycosis, neoplasia, or pulmonary fibrosis.

At necropsy, the lungs were massively enlarged, with prominent rib impressions, firm and heavy. Immediately below and elevating the visceral pleura as well as randomly throughout the parenchyma, there were multifocal to coalescing 1-10 cm diameter tan white nodules which on cut surface were dark red brown homogeneous to grey white and fibrotic and abruptly merged with intervening and occasionally compressed pulmonary parenchyma (Figure 1). There was abundant stable yellow white tracheobronchial froth with marked bilateral hilar lymphadenopathy. A moderate amount of ingesta was throughout the gastrointestinal tract.

Histopathology of the lungs revealed multifocal to coalescing nodules characterized by marked expansion of alveolar septae by loose mature to hypertrophic fibroblasts and variable numbers of lymphocytes, macrophages, and fewer neutrophils (Figure 1a). There were entrapped alveolae that were frequently lined by type II pneumocytes and the lumina contained variable numbers of degenerate and necrotic inflammatory infiltrate, sloughed type I respiratory epithelia and occasional hemorrhage (Figure 2b). Moderate diffuse lymphoplasmacytic hyperplasia with scattered lymphoid necrosis and edema were noted in the hilar lymph nodes and spleen and there was mild multifocal nonsuppurative cholangiohepatitis. No bacteria were recovered from the lung, lymph node, and spleen with normal flora cultured from the small intestine. No Salmonella spp were isolated from the bowel. Molecular studies of the lung were positive for consensus herpes virus and follow up sequencing confirmed a 100 % match with Asinine herpesvirus 5 (AHV-5).

The gross and microscopic findings confirmed the clinical diagnosis of equine multinodular pulmonary fibrosis (EMPF), a condition in horses associated with gamma herpesvirus, EHV-5. The pathogenesis of the condition has not yet been fully resolved but likely involves initial endothelial and type I pneumocyte damage with dysregulation of myofibroblasts and CD4+Th2 cells. AHV-5 and AHV-4 are other closely related gamma herpesviruses of donkeys that cause interstitial pneumonia with bronchiolitis and numerous syncytia, the latter of which were not apparent in examined lung sections for this horse. In this case, the AHV-5 was unusual. Cases of asymptomatic and sporadic infection with AHV-5 have been documented in horses and mixed EHV-5 and AHV-5 has been reported in a 4 -year-old standardbred gelding in Sweden. Currently, in-house EHV-5 test validation is ongoing and the contribution of the AHV-5 to the pulmonary fibrosis in this case is unknown. In those clinical or post mortem cases of EMPF where EHV-5 specific primers are negative, initial screening with consensus primers and follow up sequencing for AHV-5 may be of value.

Figure 1. Cut surface of a fixed portion of affected lung from an AHV-5 PCR positive animal. Note the subpleural pale nodules.

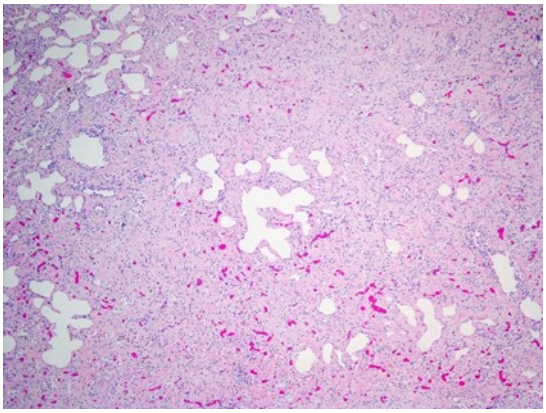


Figure 2a. Low power photomicrograph with expansile nodes which disrupt and entrap small numbers of alveoli.

Equine Multinodular Pulmonary Fibrosis and Hilar Lymphadenopathy with Detection of an Unusual Pathogen in a 14-year-old Thoroughbred Gelding cont'd

Stephen Raverty (Veterinary Pathologist)

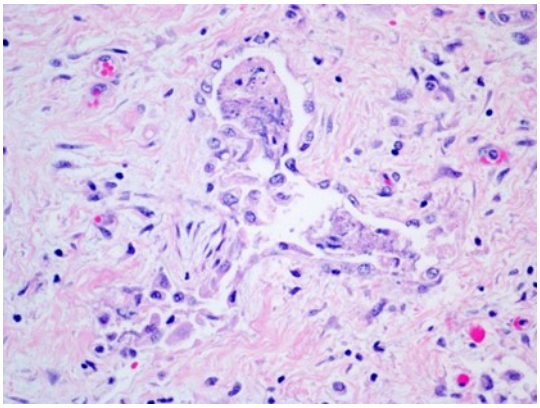


Figure 2b. Higher magnification with prominent interstitial accumulation of collagen fibers and an individualized branching lower airway lined by type II pneumocytes with central necrotic inflammatory infiltrate.

Bovine Viral Diarrhea Mucosal Disease in Two Breeding Age Dairy Heifers

Ann Britton (Veterinary Pathologist)

In late summer, 2021 two 15-16 month old dairy heifers in a group of 80 breeding age heifers (vaccinated as calves for IBR, PI, BRSV) became acutely ill. Clinical signs included dehydration, hemorrhagic diarrhea with straining, increased respiratory rate with increased respiratory sounds, cyanosis and shock. Clinical differential diagnosis was acute Salmonellosis versus Bovine Viral Diarrhea (BVD) Mucosal Disease. There was no response to antibiotic/anti-inflammatory therapy and humane euthanasia was elected.

Samples from the two heifers were collected at post mortem conducted by the clinician and sent to the Animal Health Centre for workup. Gross evaluation of the samples revealed severe hemorrhagic to fibrinous intestinal content mainly affecting the colon and rectum with marked multifocal hemorrhage in the small intestinal wall. Salmonellosis, BVD Mucosal Disease and coccidiosis were put on the differential diagnosis list and followed up with ancillary testing and histopathology.

Fecal floatation revealed mild to moderate presence of coccidial oocysts in the heifers. However, no evidence of intestinal pathology compatible with coccidiosis was found on microscopic examination. Bacterial culture of the intestinal content produced a Growth of *Clostridium perfringens* in both heifers but no *Salmonella* spp. Microscopic changes in the intestinal tract were not compatible with clostridial enteritis caused by *C. perfringens*.

PCR testing for BVD virus revealed positive results in the intestine as well as a pool of organs – lung, liver, kidney, spleen – for each heifer individually. Microscopic examination of the intestinal tract was similar for both heifers and revealed moderate to marked necrosis (death) of the cells lining the glands which make up the inner (absorptive) surface of the small and large intestine, respectively. Within the small intestine, there was herniation of intestinal glands into the submucosa with mucosal hemorrhage, often overlying Peyer's patches (lymphoid organs in the intestinal wall which mediate intestinal immune responses). Immunohistochemistry for BVD virus was positive in intestinal glands, leukocytes (immune cells) in the intestinal wall and Peyer's patches.

Workup of the samples submitted revealed BVD virus infection with pathological changes compatible with a diagnosis of BVD Mucosal Disease. Mucosal Disease (MD) is diagnosed in cattle persistently infected with a non-cytopathic biotype (PIC) which are secondarily infected with a cytopathic biotype of the virus. Alternatively, MD can occur when there is *in situ* virus mutation (mutation which occurs within the body of the infected animal) of the persistently infected non-cytopathic virus which leads to encoding of non-structural protein 3 which is cytopathic. The detection of BVDV virus in all organs as well as the intestinal tract in these two heifers is indicative of PIC.

MD is uncommon. It usually affects cattle 6 months to 2 years of age. Affected cattle will present with severe disease and high mortality with a rapid clinical course. Interestingly, there was no report of squamous epithelial involvement of the upper gastrointestinal tract or reticulorumen in the two heifers described in the article which is often reported in cattle with MD. However, immunohistochemistry demonstrated heavy presence of BVDV antigen in the squamous epithelium of both the rumen and the abomasum in the affected heifers in the absence of any pathology.

In addition to MD, infection of cattle with BVD virus can result in a number of different disease presentations depending on the time of infection and strain (biotype) of the BVD virus involved. Biotypes are categorized as non-cytopathic and cytopathic depending on their ability to damage and kill cells in cell culture. To make things even more complicated, genetic studies have demonstrated two genotypes, BVD-1 and BVD-2, which both contain a stable of sub-genotypes which can be

Bovine Viral Diarrhea Mucosal Disease in Two Breeding Age Dairy Heifers cont'd

Ann Britton (Veterinary Pathologist)

either non-cytopathic or cytopathic.

Persistently infected cattle carry the non-cytopathic strain, are infected for life and will infect their calves *in utero* leading to the birth of PIC. Initial infection of cows with non-cytopathic BVD virus during the first 4 months of pregnancy can also result in the birth of PIC. Early *in utero* exposure to BVD virus can further result in reproductive failure whereas exposure after 4 months of gestation can result in congenital malformations, abortion, premature birth, stillbirth or birth of weak calves.

Cattle are reported to be most commonly exposed to BVD virus as a result of shedding of the virus by PIC herd mates. Cattle thus exposed often develop no signs or mild clinical signs but some may develop clinical disease. This acute BVD disease is characterized by fever of about 40°, depression, decreased milk production, loss of appetite, increased respiratory rate, nasal discharge, tearing and diarrhea. Death is uncommon and cattle usually recover within 3 or so days.

Infection with some strains of BVD-2 can lead to more severe acute disease of longer duration (up to 1 week) with higher mortality. Severe acute BVD disease is characterized by high fever up to 42°, ulcers in the mouth and on the coronary band and interdigital cleft of the hoof and diarrhea. Small hemorrhages may be seen on the mucosal membranes of the eyes, mouth and vulva.

Fortunately, all presentations of BVD disease are very uncommonly diagnosed at the Animal Health Centre. This may be the result of testing and culling programs for PIC as well as vaccination protocols. If you are concerned about the possibility of BVD virus infection in your herd, please consult your veterinarian to discuss screening programs and the suitability of a vaccination program for your situation.

Flood—Spoiled Feed Management

Tony Redford (Veterinary Pathologist)

During the recent flooding events in Southwestern BC in late 2021, many livestock producers have had a variety of impacts. One of these challenges is contamination and spoilage of feed, composting on farm or storage for future land application is likely the best option. Some recommendations from a few resources on the topic include:

- Carefully inspect the outside of bales, ag bags, etc. for the presence of increased moisture and water infiltration.
- As a general guideline, bales that have been wet should have at least the outer 20% discarded, though this will vary by how much flood water was on the property and how long it was there. Any identified wet hay should be discarded, and the adjacent layer of hay should also be discarded as a precaution.
- Flooded Ag Bags may only be wet on one side. However, water will often move along the bottom of the bag/feed, so inspection of the bottom portion of feed is necessary.
- The outer perimeter of silage piles should also be inspected for contamination. In general, any flood-contaminated silage and the adjacent two feet of a silage should be discarded.
- As with other feed, grain in bins should be inspected. Wet grain can be mixed in compost piles with other feed.
- Feed that will be composted should be moved to a dry (or driest part if flooding still partially present) of the pasture/property.
- The compost piles should be well away from buildings, as composting feed can reach temperatures high enough to combust and fires can spread quickly.
- Compost/feed piles should be kept low (4 to 6 feet maximum) to keep internal compost temperatures from elevating too high.
- It is ideal to have multiple smaller piles rather than one bigger compost pile, as this will also keep temperatures down, and there is a smaller amount of fuel if a fire starts in one pile.
- If there is a concern for local wildlife scavengers, any grain should be mixed with or placed under cover of hay / silage.

AEM Code Guidance for composting or spreading of agricultural by-products.

The event will have generated a significant amount of agricultural by-products including:

- Solid manure—wet
- Soiled animal bedding and feed
- Agricultural, vegetative material—spoiled crops (on land and in storage)

AEM Code provides for

1. The land application of these as nutrient sources (Note restrictions such as setbacks, soil/weather/topographic conditions). Land application can only occur during February and onwards.
2. The composting as agricultural compost of these materials in outdoor composting facilities.

General rules for composting

- Collect and contain any leachate generated and do not discharge directly into a watercourse or onto the land
- Divert rain or stormwater runoff from entering piles
- Prevent contaminated runoff, air contaminants and leachate from entering watercourses, crossing your property boundary, or going below the water table
- Prevent wildlife, pests, and domestic pets from accessing composting structures or outdoor piles

Flood—Spoiled Feed Management cont'd

Tony Redford (Veterinary Pathologist)

Outdoor agricultural composting piles

- Locate the pile in a high, dry area (i.e., not in standing water, water-saturated soils or seasonally flooded areas) and set back at least:
  - 30 metres (100 feet) from drinking water sources and watercourses
  - 4.5 metres (9 feet from your property boundary
  - Piles may stay in one location for up to 12 months for agricultural by-products
  - Check the pile weekly, keep records of the date that composting began, type and source of materials, the location, and what you found

https://www2.gov.bc.ca/gov/content/environment/waste-management/industrial-waste/agriculture/regulation-requirements

Support for those affected by floods and mud-slides

Melissa Trapp (Lab Science Officer—Virology)

As supports transition from the ServiceBC Flood Response Hotline. These three websites will have the most current information:

B.C.'s response to floods and mudslides

https://www2.gov.bc.ca/gov/content/natural-disaster/support/home

Ministry of Agriculture, Food and Fisheries response to flooding

https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/water/flooding-emergency-resources

City of Abbotsford Return Home Plan

https://www.abbotsford.ca/returnhome

Disease Risk in Dairy Cattle Following the 2021 Sumas Prairie Flood Event

Glenna McGregor (Veterinary Pathologist)

The drastic flooding of the Sumas Prairie near Abbotsford in late 2021 has now largely subsided . Flood water rose over 5m in some dairy barns and fields, killing upwards of 400 head of dairy cattle and forcing thousands of other dairy cattle to be relocated or stand in deep water for days while their owners struggled to care for them. The water has now largely drained away, fields are drying out and new calves are bringing hope into the barns. But this is no time to be complacent. Unfortunately, the toll of such a major flood event on animal health can persist long after the flood waters recede. The following is a non-comprehensive list of some of the infectious diseases that we may see increase in prevalence in flood-affected dairy herds, even long after the flood is over.

Diseases associated with increased environmental exposure following flooding:

Blackleg:

Blackleg, a frequently fatal disease in cattle, is caused by *Clostridium chauvoei* bacteria. These bacteria form hardy spores that can persist in the soil for decades. Floodwaters can disturb the soil where the spores are buried and carry them into pastures and hay fields where they may be consumed by cattle. The bacteria are absorbed through the intestinal tract into the blood stream and are deposited in muscle where they remain dormant until there is some type of trauma to the muscle resulting in a localized area of low oxygen that allows the bacteria to proliferate and produce potent toxins that rapidly result in death. Affected animals most commonly present as sudden death, or less commonly, acute-onset lameness and marked depression often with an edematous and crepitant muscle swelling on one of the hips, shoulders or brisket, although any muscle can be affected. The mortality rate is very high, death usually occurs with 12 to 48 hours.

Outbreaks are common following floods, often occurring in dry periods subsequent to a flood event. Blackleg results in sporadic deaths in dairy cattle in the Fraser Valley submitted to the AHC; although, the year-to-year prevalence varies markedly, likely due to changes in the accessibility of the spores in the environment. It is certainly possible that this winter's flooding will increase the prevalence next spring, summer and fall, particularly if we have a dry spring and summer.

Fortunately, we have several highly effective vaccines that prevent Blackleg. Farms currently vaccinating for Blackleg may wish to ensure cattle are up-to-date. Farms not currently vaccinating for blackleg may wish to consult with a veterinarian familiar with the farm to determine if these vaccines are worthwhile, particularly during this period of potentially higher risk.

Leptospirosis:

Throughout the world, flooding events and periods of high rainfall are strongly correlated with increased leptospirosis risk in animals and humans as *Leptospira* spp. bacteria survive longer in the environment in moist conditions. Leptospirosis is caused by infection with *Leptospira* spp. bacteria, which are most commonly shed in the urine of wildlife maintenance hosts such as skunks, raccoons, and rats. Infection in dairy cattle is associated with abortions, reproductive failure, stillbirths and the birth of weak calves. Less commonly it results in severe acute disease, particularly in youngstock, characterized by high fever, hemolytic anemia, hemoglobinuria, jaundice, pulmonary congestion, occasionally meningitis, and death. In lactating cows, it may be associated with agalactia with small quantities of blood-tinged milk.

At the Animal Health Centre in Abbotsford, Leptospirosis has been rarely diagnosed as the cause of abortion storms and calf losses in dairy cattle. The acute severe disease associated with leptospirosis has not been diagnosed in dairy cattle at the Abbotsford Animal Health centre in the last 10 years. But the risk is there: prevalence testing (tissue PCR) in wildlife has demonstrated a relatively high prevalence of leptospirosis in wildlife with 18% of skunks (9/49), 21% of raccoons (12/56), and 50% (3/6) of beaver tested at the Animal

Disease Risk in Dairy Cattle Following the 2021 Sumas Prairie Flood Event cont'd

Glenna McGregor (Veterinary Pathologist)

Health Centre between January 2012 and May 2021 positive on Leptospira spp. PCR. Approximately 11% of rats in Vancouver were positive with marked variation in prevalence between city blocks (Himsworth et al., 2013).

If possible, obtaining a diagnosis for the cause of abortions and calf losses will help rule in/out leptospirosis and inform management steps for the rest of the herd. There are several vaccines available for leptospirosis. Consultation with a veterinarian familiar with the farm to determine if these vaccines are warranted is recommended.

Environmental Mastitis:

Exposure to dirty water, interruption of milking routines, and stress will render flood-affected cattle more susceptible in mastitis. The Sumas Prairie floodwaters are presumed to be highly contaminated with a range of bacteria, so mastitis due to uncommon environmental bacteria, such as *Pseudomonas* spp. and *Serratia* spp., are possible. Bacterial culture and sensitivity testing of cows with mastitis will be particularly important for guiding treatment, particularly in animals not responding to first-line antimicrobials.

Salmonellosis:

Prior to the flood we were seeing high rates of *Salmonella enterica* subspecies enterica serovar Dublin (S. Dublin) in dairy cattle in the Fraser Valley, predominantly resulting in calf septicemia and occasionally scours. The flood led to manure contamination of feed, mixing of cattle and stress, all of which have the potential to increase Salmonella transmission and the spread of Salmonella to previously unaffected herds. Calves often present with high fevers, and respiratory distress. Unfortunately, the closure of the Animal Health Centre has curtailed several surveillance projects for S. Dublin in BC. Farms concerned they have cases of S. Dublin should consult their veterinarian and/or the AHC for diagnostic and management options.

Botulism:

Botulism is uncommon in cattle, but outbreaks in dairy cattle following flooding in New Zealand and Australia have been reported. Botulism generally occurs when animals eat the preformed botulinum toxin produced by the bacteria *Clostridium botulinum* in spoiled feed or feed contaminated by decaying carcasses. It can affect cattle of all ages resulting in sudden onset weakness, incoordination and flaccid paralysis that is often lethal due to paralysis of the muscles needed for respiration. Caution feeding spoiled feed is suggested. Testing for botulism is challenging, relying on a mouse inoculation assay with serum, tissue or feed from suspect cases/ sources. Most veterinary testing in Canada is done at the Animal Health Lab and the University of Guelph.

Other potential infectious diseases:

With the extensive immersion of some cattle in water, foot rot is also a likely sequalae. The stress of transport, disrupted feeding routines, changes in diets and mixing with other herds will also increase the likelihood of stress-associated diseases such as pneumonia and enteritis. Mixing of cattle from different herds increases the likelihood of disease transmission between herds of a number of pathogens including BVD, IBR, PI3, Johne's disease, and several others.

Animal Health Centre Lab in Abbotsford

Unfortunately, with the temporary closure of the Animal Health Centre diagnostic lab in Abbotsford due to flooding of the lab building, surveillance for these diseases and many others is temporarily limited within the province. However, Animal Health Centre staff are available, and veterinarians or farmers concerned about infectious disease in their herd are always very welcome to email (PAHB@gov.bc.ca) or call (604-556-3003) the Animal Health Centre and we will guide them through alternate testing options while the lab is closed.

STAFF AWARDS & ACCOMPLISHMENTS

Please join us in congratulating **Dr. Chelsea Himsworth** on her promotion to the rank of Associate Professor (Partner) at the School of Population and Public Health, Faculty of Medicine, University of British Columbia. This promotion comes after a rigorous 18 month review of academic achievements by a panel of international experts and Chelsea is only the second Partner to be successful in this endeavour.

Congratulations Chelsea!

Dr. Himsworth was also selected for the UBC Science Co-Op Supervisor Recognition Award for 2021. This award is in appreciation for the training and support we provide to our co-op students at the AHC.

Congratulations Chelsea on this outstanding achievement!

Please join us in congratulating **Dr. Kazal Ghosh** on successfully completing the Immunology and Virology subspecialty exam of the American College of Veterinary Microbiologists (ACVM). Dr. Ghosh is now an ACVM diplomate certified in veterinary Bacteriology / Mycology, Virology and Immunology.

Congratulations Kazal!

Common Chicken Breeds Word Search

A	Q	L	F	H	P	U	L	R	B	Y	E	B	R	A	M	H	E	M	Y
L	E	G	H	O	R	N	H	K	G	L	I	A	K	N	A	F	O	X	R
J	O	R	S	I	L	K	I	E	Z	K	Y	W	Q	P	R	T	T	T	W
C	G	H	P	H	H	P	L	O	S	U	S	S	E	X	A	K	S	D	W
M	K	O	D	C	V	L	D	V	X	B	W	F	P	J	N	L	P	K	O
Q	G	D	Z	K	B	Y	R	V	K	L	U	G	F	R	S	Y	C	Y	U
C	G	E	Q	O	L	M	G	R	S	M	Q	Z	A	Z	I	F	B	L	D
X	F	I	O	E	D	O	L	F	L	A	K	F	U	Y	V	X	V	G	N
Z	Q	S	S	L	H	U	U	L	W	L	M	N	S	M	W	E	K	E	A
Y	G	L	O	P	J	T	J	B	U	J	L	E	T	N	C	B	Q	D	S
R	G	A	R	M	L	H	J	X	K	P	L	W	R	J	L	J	F	E	T
S	B	N	P	Y	R	L	E	E	O	W	P	H	A	A	J	V	G	V	Y
U	R	D	I	U	W	O	W	D	U	G	C	A	L	Q	U	N	V	Q	L
D	A	R	N	A	L	C	F	X	O	P	J	M	O	N	N	C	Z	O	U
O	H	E	G	M	T	K	O	X	Z	Y	U	P	R	Y	Z	D	A	K	W
S	M	D	T	C	P	Z	K	A	B	A	F	S	P	J	B	U	W	N	U
F	A	A	O	Q	N	N	L	B	D	O	Q	H	A	P	J	C	U	V	A
V	K	D	N	E	T	Q	T	O	U	H	A	I	D	K	I	P	N	L	A
U	P	Q	G	X	Q	J	R	G	G	H	B	R	O	I	L	E	R	T	X
B	M	X	A	O	D	T	Y	Z	X	M	J	E	W	Q	K	V	B	Q	G

Can you find all of the following chicken breeds in the above word search?

RHODE ISLAND RED

SILKIE

LEGHORN

AMERAUCANA

SUSSEX

BROILER

MARANS

ORPINGTON

PLYMOUTH ROCK

AUSTRALORP

BRAHMA

NEW HAMPSHIRE