

Animal Health Monitor

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Ministry of
Agriculture
and Lands

IN THIS ISSUE

- **The Last Sockeye**
- ***Tritrichomonas* in a cat**
- **Post mortem room case**
- **West Nile virus update**
- **ILT Update, 2010**
- **Johne's disease testing**
- **Milk culture results**
- **Pathogen discovery**
- **Local Pollinators**

Message from the Chief Veterinary Officer

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



The Last of the Sockeye

It is gratifying to see the large number of Sockeye salmon returning to spawn this year.

Clearly the predictions of the demise of the Sockeye were as inaccurate as those of the extinction of the Pink salmon a few years ago. The life cycles of the different species of salmon have developed over millions of years and have proved sufficiently robust to adapt to the gradual changes that have also occurred over that time to climate, predators, environment etc. as well as any

dramatic local influence such as landslides, forest fires and insect caused deforestation that affect spawning sites. The genetic diversity within the population allows some to accommodate to certain changes better than others, and these ensure continuation of the species. Where genetic heterogeneity does not exist, such as in, for example the cheetah population of Africa, there is the risk that a new disease could destroy the whole population, but this is very much an exception.

There are examples in history where a new disease has had a huge effect on existing populations, such as bubonic plague on humans, canine parvovirus on dogs, or distemper on seals but there are always some individuals that do not succumb, and pass on their resistant genes. The idea, therefore that wild salmon would be seriously threatened by an existing disease, such as sea lice or infectious hematopoietic necrosis would seem unlikely.

Survival of species is complex, even when we think we understand all the elements involved. The dodo in forsaking winged flight made itself vulnerable to hungry sailors and

could not quickly regain its ability to escape, and other similarly specialized species leave themselves at risk. But the example of the dodo does demonstrate that to effectively threaten a species, man's activities must involve physically removing as many of that species as possible, which, with appropriate inventiveness can approach 100%, as almost happened with the Atlantic cod, and most of the large species of whale.

The factors that affect salmon populations are diverse and complex, and likely to do with habitat, disease, food supply, sea temperature, predators, dams etc. We know a considerable amount about the fresh water component of the salmon life cycle, and major success has been achieved in preserving spawning beds and restricting catches when the adult salmon return, but we know very little about the larger, salt water component of their lives. Protocols have been developed for a number of salt water fish species to study fluctuations in their populations. Cycles in the return rates of the different salmon species have been recognized over many years, and surely it is time that new technology be applied to the monitoring of salmon at sea in order to develop a more informed opinion on the impact of disease on their saltwater survival, and therefore on their return rates. Without fully understanding the critical factors that affect salmon survival, too much emphasis is given to perceived threats- as if protecting the dodo from feather lice would have saved it from extinction.

***Tritrichomonas foetus* in the Domestic Feline**

John Robinson, Virologist

Recently, a fecal sample submitted from a SPCA cat suffering with chronic diarrhea was found to be infected with *Tritrichomonas foetus*. This protozoan parasite is a relatively new emerging pathogen of cats, though it has previously been recognized as an important cause of infertility and other reproductive problems in cattle.

Tritrichomonas foetus infection in cats is manifested by colitis resulting in intractable diarrhea of semi-formed or liquid feces. The disease is often detected in animal shelters, breeding colonies and wherever there is a shared environment with a high density of cats. It usually affects kittens or young cats and pedigree cats such as Siamese and Bengal appear to have a significantly higher rate of infection. Studies have shown the organism to be quite widespread in feline populations in the United States and in Europe. It is not known if *Tritrichomonas* plays a role in cat infertility or abortion problems. Tom cats have been suggested to be carriers of the pathogen in their prepuce.

Detection of the organism in feces by Polymerase chain reaction is considered to be the most sensitive and specific test available. Resolution of the disease in infected cats is normally long term with an average of nine months to two years. Cats tend to shed a low level of organisms for several months following resolution of the colitis.

T. foetus is thought but not proven to be a human pathogen and thus as a precaution individuals are advised to practice hygienic precautions in handling infected cats and their feces. This also helps to prevent spread from cat to cat through human contact.

“Animals generally return the love you lavish on them by a swift bite in passing — not unlike friends and wives.”
Gerald Durrell

Slices and dices from the postmortem room

Don McIntosh, Pathologist

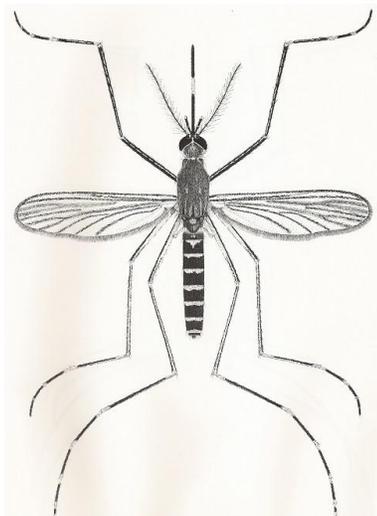
A five year old Holstein dairy cow 1 month post-partum died after a brief illness. A necropsy revealed numerous type 1 and type 2 ulcers of the abomasal mucosa with extensive hemorrhage into the abomasum. The cause of death was extensive blood loss and shock due to primary abomasal ulcers. The cause of this syndrome in dairy cows is poorly understood and largely unknown. In some cows ulcers may be secondary to direct insults to the abomasal mucosa such as gastric lymphomas or viral diseases such as Bovine Viral Diarrhea (BVD). Other suggested causes are hyperacidity, direct abrasion from coarse feeds, bacterial infections such as *Clostridium perfringens* A, fungal infections, copper deficiency, and stress. The fact that many ulcers occur in the first month post-partum suggests the stress of parturition and onset of lactation may be a factor; however, they are also seen less frequently in cows 3 – 6 months after calving. The feeding of corn silage and high moisture feeds has been proposed as a factor but they are also found in grazing cows in the summer. Ulcers have also been associated with displacement of the abomasum, metritis, ketosis, and mastitis.

Cows usually do not die from abomasal ulcers unless the ulcers erode a blood vessel or perforate the abomasal wall to cause peritonitis. The fact that several cows in a herd may concurrently have this problem should alert the farmer who has this diagnosis on one animal to be watchful for additional affected cows within the herd.

As the cause is largely unknown it is difficult to recommend definitive preventative measures, however, there are certain precautions that may reduce the risk especially in herds where there is a high instance of this problem.

- If the ulcers are secondary to abomasal lymphoma the herd should be checked for Bovine Leukosis Virus (BLV). Similarly if they are secondary to BVD the herd should be screened for this virus.
- Adopt management practices that reduce stress, especially around calving.
- Avoid management practices that can lead to digestive upsets, displaced abomasums, ketosis, or mastitis.

Beware of the biting bugs



As you probably know, locally acquired West Nile virus (WNV) was detected in British Columbia in September 2009. Laboratory confirmed infection was reported in ten mosquito pools, three horses, and two residents in the Okanagan and Fraser Valley areas. The virus amplifies in the bird-mosquito cycle over the summer months and is more widespread in the late summer. As of September 7, 2010 two infected birds have been identified from the Kelowna area this year. There is a high probability of additional WNV activity in the province this season. Veterinarians in BC should include WNV infection in their list of differential diagnoses as it can affect a wide variety of mammalian (e.g., horses, dogs, cats, squirrels, raccoons) and avian species.

To facilitate the provincial WNV monitoring and prevention program and the veterinary diagnosis and reporting of WNV in animals, the equine IgM capture ELISA serologic test is available at the Animal Health Centre. This laboratory test is limited to submissions from within BC. *For horses, WNV is a preventable disease- remind horse owners to maintain current vaccination against West Nile virus.*

ILT in the Fraser Valley- Update, 2010

Bill Cox, Poultry extension Veterinarian

Infectious Laryngotracheitis (ILT), a serious respiratory disease of chickens caused by a Herpesvirus, has occurred in epizootic proportions in BC poultry over the past few years. In 2009, the number of cases was higher than in any previous year.

Typically, ILT occurs in the spring, summer and early fall seasons. The spread of the disease is assisted by hot, dry, and windy weather when virus-contaminated dust and feathers from infected flocks can blow onto farms possibly several kilometres apart. At the same time, poultry barn vents are wide open and fans are on high to ventilate and cool the birds. This effectively draws the virus laden dust into the barn and exposes flocks of susceptible birds. While the virus can also be spread by people or equipment moving from farm to farm, wind-borne distribution appears to be a significant contributor.



In 2009, a total of 56 cases of ILT were reported affecting 50 farms; half of those cases were in broiler chickens. In mid-summer, poultry producers and their veterinarians met to collectively assess the outbreak and develop mitigation strategies. Steps taken by the industry included enhanced biosecurity practices, well-planned transport routes, special manure handling practices, and vaccination. In 2009, a new vaccine, available only under permit in Canada, was used to help prevent ILT in broiler chickens. This added control

measure is considered to have been very effective since no vaccinated flocks developed disease.

In 2010, ILT appeared early in the year, starting at the end of March. Control measures were implemented immediately and flocks of chickens at high risk were vaccinated. Subsequently, the incidence of ILT dropped significantly. From late March until September 7th, only 19 cases have been reported, most being sporadic rather than clustered. As we move into fall, it appears that a combination of good biosecurity, vaccination, and, possibly, some good luck, has helped the poultry industry avoid another serious outbreak of ILT.

Improved Diagnostic testing offered for Johne's disease

Erin Zabek, Microbiologist and Jane Pritchard, Manager Livestock Health Regulatory Unit

Johne's disease in cattle presents huge challenges in disease diagnosis and control, and has serious economic impacts for farmers. To provide the best technology in diagnostics, the Animal Health Centre has acquired a new BD BACTEC MGIT 960 Mycobacterial system for the detection of *Mycobacterium avium subspecies paratuberculosis* (Johne's disease) from fecal samples. The advantage to this new system is that results are read in 49 days (rather than the previous 12 weeks) and it can detect as few as 1-10 viable organisms from fecal specimens.

Johne's disease is a contagious, slowly progressive, incurable, bacterial infection that causes severe thickening of the intestine and prevents absorption of nutrients. Clinical signs of this disease include persistent diarrhea and extreme weight loss despite a healthy appetite. It is a problem in both beef and dairy herds and is usually diagnosed at necropsy. Animals are infected when they consume infected milk, colostrum or manure from a contaminated environment. The bacteria are very hardy, surviving up to a year on pasture, in manure and in water. Young calves are highly susceptible to infection however clinical signs don't manifest until cattle are older. Johne's disease is usually introduced into a 'clean' herd with the purchase of infected healthy appearing animals. As young infected cattle look normal, they may be bought, sold or kept in a herd for years without the producer knowing of the infection. Compounding the problem, during this preclinical stage they are shedding MAP bacteria into the environment and infecting other animals.

The new MGIT 960 system utilizes a supplemented liquid medium that can detect as few as 1-10 viable organisms from processed specimens in <49 days. The specimen is inoculated into a MGIT 960 Para TB medium tube with supplement; the tube has a fluorescent compound that is embedded in silicone on the bottom. The fluorescent compound is sensitive to the presence of oxygen dissolved in the broth. Actively respiring microorganisms consume oxygen and cause the sensor to fluoresce. Specimen tubes entered into the MGIT 960 System are continuously incubated at 37 °C and monitored every 60 minutes for increasing fluorescence. Analysis of the fluorescence is used to determine if the tube is instrument positive; i.e., the test sample contains viable organisms. An instrument positive tube contains approximately 10^5 to 10^6 colony-forming units per millilitre (CFU/mL), these tubes are removed from the system and the presence of MAP is confirmed by acid-fast stain and/or PCR. Culture vials which remain negative for 49 days (seven weeks) are removed from the instrument and declared negative.

Farmers should work with their veterinarians on a Johne's prevention and control program. Please contact the Animal Health Centre at 604-556-3003 regarding submissions for Johne's (MAP) testing.

Milk culture results

Jane Pritchard, Manager Livestock Health and Regulatory Unit

The graph below shows the type and frequency of bacteria isolated from diagnostic milk samples from cattle with mastitis submitted to the Animal Health Centre between January 2010 and August 15, 2010. A summary of the antimicrobial resistance profile for 5 of the bacteria is reported below. This will be a regular feature in the newsletter. If there is other information that you would like to see reported, please let us know.

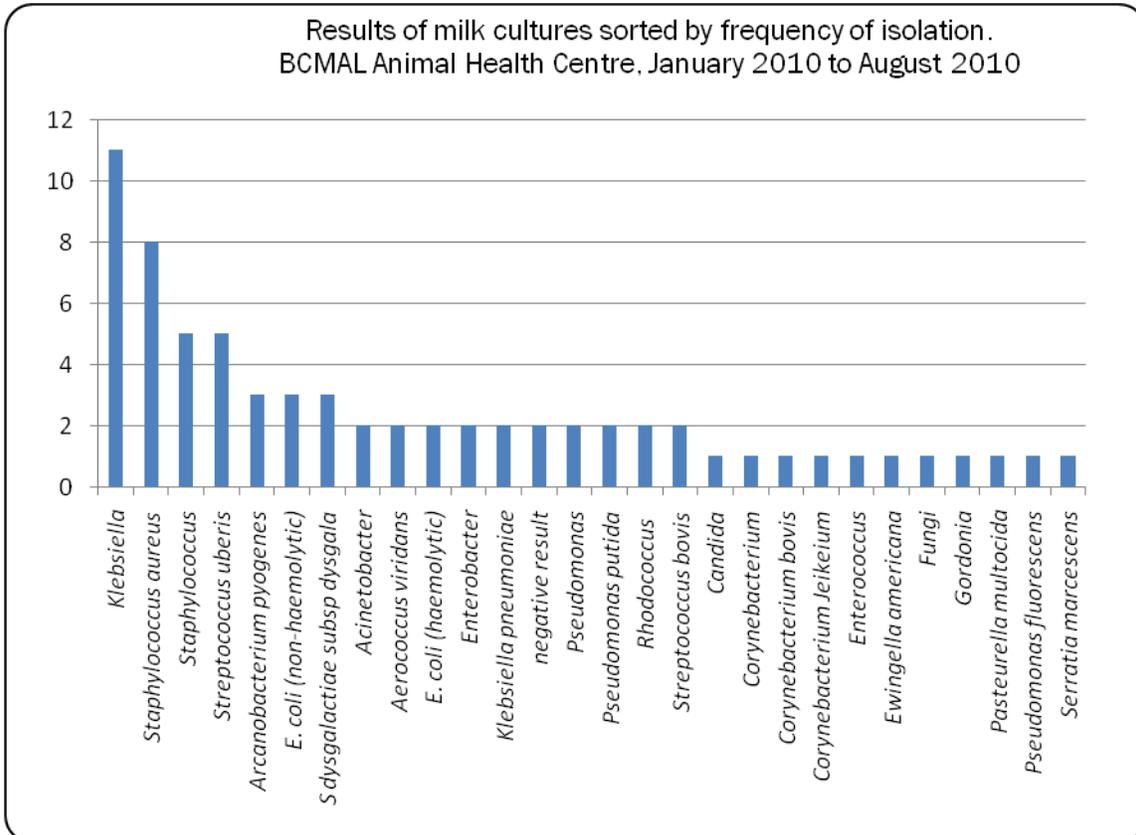


Table 2. Percentage of isolates resistant to tested antibiotics

[amp = Ampicillin, kf = Cephalothin, ob = Cloxacillin, e = Erythromycin, xnl = Excenel, p10 = Penicillin, pyr = Pirlimycin, sxt = Sulfamethoxazole/Trimethoprim, tet = Tetracycline]

| | amp | kf | ob | e | xnl | p10 | pyr | sxt | tet | N |
|---|------|-----|------|------|-----|------|------|-----|------|----|
| <i>Klebsiella</i> spp. | 100% | 25% | 100% | 100% | 25% | 100% | 100% | 0% | 17% | 12 |
| <i>Staphylococcus aureus</i> | 13% | 0% | 0% | 0% | 0% | 13% | 0% | 0% | 0% | 8 |
| <i>Staphylococcus</i> spp. | 14% | 0% | 29% | 14% | 0% | 14% | 14% | 0% | 29% | 7 |
| <i>Streptococcus uberis</i> | 20% | 20% | 40% | 0% | 20% | 20% | 20% | 20% | 20% | 5 |
| <i>Streptococcus dys</i> sub <i>dys</i> | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 3 |

Pathogen Discovery: Use of 4-5-4 microarrays for detection and phylogenetic characterization of novel reoviruses from an aborted Steller sea lion fetus (*Eumetopias jubatus*)

Stephen Raverty,¹ Gustavo Palacios,² Hendrik Nollens³, Ana V. Bussetti², Jeffrey Hui², Nazir Savji², James Wellehan³, Dyanna Lambourn⁴, Steven Jeffries⁴, Thomas Briese², Ole Nielsen⁵, W. Ian Lipkin, MD² ¹Animal Health Center, Abbotsford, BC, Canada; ²Center for Infection and Immunity, Mailman School of Public Health, Columbia University, New York, USA; ³Marine Mammal Health Program, College of Veterinary Medicine, University of Florida, Gainesville, FL 32610, USA; ⁴Washington Department of Fish and Wildlife, 7801 Phillips Road SW, Lakewood, WA, 98498, USA; ⁵Department of Fisheries and Oceans, Winnipeg, MB, Canada

As part of an ongoing effort to better characterize the health status of marine mammals in the northeastern Pacific Ocean, the recovery of dead or moribund stranded seals, sea lions and whales have been pursued. With the identification of novel or emerging health concerns in these populations, efforts to initiate complimentary and targeted live capture and health and biologic assessments have been pursued. This case report describes the identification and characterization of a novel reovirus in an aborted Steller sea lion (*Eumetopias jubatus*) fetus. In 2005, an adult female Steller sea lion spontaneously aborted a mid-gestational fetus on a floating haulout trap prior to days capture attempt. The fetus and attached placenta were recovered and submitted for diagnostic evaluation. As part of the diagnostic evaluation, tissues from pup were inoculated on VERO cell lines. Cytopathic effect, characterized by syncytia formation, was noted and cultures were forwarded to the Marine Mammal Health Program, University of Florida to screen for calicivirus and herpesvirus. Polymerase chain reaction proved negative for these pathogens and RNA extracts were forwarded to the Center for Infection and Immunity, Columbia University for microarray analysis. RNA was extracted by RNeasy Tissue Kit (Qiagen, Velencia, CA) and analyzed by GreeneChip Vr1.5. A novel avian Reovirus was identified in the sea lion fetus. Without in situ hybridization or immunohistochemistry; however, it is difficult to resolve the contribution of this virus to the loss of the affected animal. As a follow up to this investigation, tissues from 2 harbor seal pups recovered from the wild, presented to a local rehabilitation facility and subsequently found dead within 24 hours, were submitted for culture. Analysis of tissue culture isolates identified a novel human Reovirus. Use of GreeneLAMP analysis may prove a valuable adjunct to investigations of unusual pathologic findings and potential introduction of novel pathogens.

Hunger Limits Local Pollinator Fauna

Paul van Westendorp, Provincial Apiculturist

Bumble bees can play an important complementary role in the pollination of blueberry. Blueberry is the most valuable field crop in the Fraser Valley with sales in excess of \$100million per year. The high bush blueberry is insect pollination-dependent and requires an abundance of pollinators throughout its 3-4 week blooming period in April. At an estimated 4.5 – 5 million flowers per acre, only honey bees are available in sufficient numbers to meet the crop's pollination requirements. However, inclement weather often reduces honey bee foraging while other pollinators especially bumble bees, are less affected by cool weather and continue to forage. Under those conditions, bumble bees could off-set part of the reduced foraging behavior of honey bees.

In early spring, a mated bumble bee queen will emerge from her winter hiding place and establish her own nest. She seeks a nesting site near the roots of shrubs in gravelly and sandy soils. Her offspring consists of successive generations of infertile female workers who assist in gathering food and enlarge the nest through the season. In July-August, a few reproductive males (drones) and females will be raised. After mating, only the females will disperse and winter on their own to establish their respective nests during the next spring.

Numerous studies attribute the destruction of undisturbed nesting habitat as the primary cause of the decline of wild pollinator populations in many areas. A study project in the Fraser Valley funded by the BC Blueberry Council determined that suitable nesting habitat was not the limiting factor of the abundance of bumble bee populations. Instead, insufficient floral food sources after the blueberry bloom proved the principal cause of low wild pollinator fauna in agricultural areas. Mono-cultural farm practices confine food availability to the short period of crop bloom, while few other floral sources remain available during the late spring and summer to sustain the bumble bee populations. Unlike honey bees, bumble bees and other wild pollinators have limited foraging range and must gather all their pollen and nectar sources within a radius of 0.5 – 1.0 km. A protracted period of limited food sources will cause increased mortality among bumble bee nests, or severely limit their development through the remainder of the season. As a consequence, only few sexually-maturing individuals will be reared by local bumble bee populations.

The planting near blueberry fields of a variety of floral sources that provide nectar and pollen during the spring and summer season is sufficient to support greater pollinator abundance and species diversity.

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 bulletins on our website: <http://www.agf.gov.bc.ca/ahc/AnimalHealthMonitor.html>

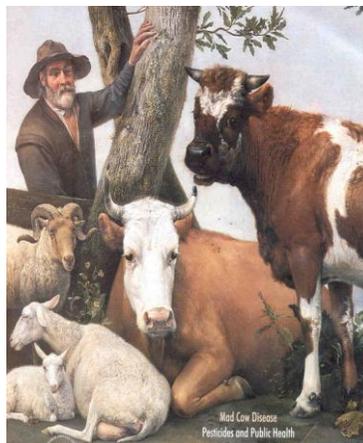
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The Bull (detail), 1647, By Paulus Potter (1625-1654) [about the cover]. *Emerg Infect Dis* [serial on the Internet]. 2001 Feb Available from: <http://www.cdc.gov/ncidod/EID/vol7no1/cover.htm>