Animal Health Monitor

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What's in a Name

What's in a name? A great deal when it comes to trade in animals and animal products.

Over the years, the World Trade Organization (WTO) has focused on reducing the legitimate constraints to trade between member countries, so that it has become more difficult for one country to provide a defensible reason for excluding the exports of another. However, animal disease is a defensible reason for excluding imports, if it can be shown that by so doing there is a risk to the importing country of also importing a disease not already present that could threaten the health of its livestock. If we assume that imports are generally regarded as a potential economic threat to a country's own industry, whether cars or agricultural produce, there is a clear incentive to rationalize any import restriction by saying that it is due to the risk of also importing disease, in the case of agricultural imports, as it is no longer acceptable under free trade agreements to give the excuse that the imports threaten the domestic industry.

This then raises the question of how do you know which diseases are present in which countries. This is partially answered by the World Organization for Animal Health (OIE), which includes almost all countries. The OIE maintain an oversight of trade limiting animal diseases by requiring all member countries to report the presence of a specified list of diseases. These are reported either immediately if there is an outbreak of a previously absent disease, or on an annual basis for those less significant diseases that are widespread in many countries.

It therefore follows that countries have to know what diseases are present on their territories by having an adequate disease surveillance strategy in place to detect these trade limiting diseases. Should such a disease be discovered, it will be reported to OIE – bearing in mind of course that the country will be punished by having restrictions placed on some of its exports.

It is enlightening to see how different countries have approached the dilemma of transparent animal disease reporting. It is a balance between minimizing the trade consequences of having a disease, and maximizing the economic advantage gained over a competitor who reports a disease.

The Western European countries joined in a political and economic union which allowed free trade of goods, including live animals and animal products. The exception is when one country is free of a disease which is present in its neighbor. A scramble developed, particularly in the more northern countries with the well developed veterinary services to eradicate diseases which could be used to exclude cheap imports. A classic example was the decision in the UK to make Newcastle Disease, a highly contagious disease of poultry, controllable by slaughter of affected flocks together with a ban on the use of vaccination against the disease. This effectively prevented the importation of poultry products from France, where they were being produced more cheaply, but where Newcastle Disease was also present. A problem arose when it was discovered that the pigeon population in the UK, including racing pigeons was affected with Newcastle Disease virus. Under the legislation the privately owned racing pigeons infected with the virus should have been slaughtered, but attempting to do so, particularly in the north of England where keeping racing pigeons is an established practice, would likely have caused social unrest. The solution was to call the virus in pigeons by another name, pigeon paramyxovirus, hoping that no-one would make the connection to Newcastle Disease virus – and it worked. However, the historical practice of excluding livestock from Europe into the UK because UK could more easily control and eradicate diseases due to its island status did create ill feeling, which expressed itself dramatically with the arrival of BSE.

The Europeans, led by the Germans were very quick to impose a ban on British beef, on the basis that this was a major health hazard. Exports from the UK stopped, but the problem was that, because of the very long incubation period in cattle for BSE, many live cattle had already been exported to European countries before the ban was put in place.

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What's in a Name by Dr. Paul Kitching (continued)

What was initially amazing, was that none of these countries subsequently reported any evidence of BSE, although one at least reported an increasing level of nervous signs in cattle associated with mortality which tested negative for rabies. The Europeans had made a major issue about the health hazards of BSE, they could not now say that it was not so bad after all. Eventually more and more European countries admitted the presence of BSE in their cattle herds, but usually only after a lot of pressure to do so.

Which leads to the other strategy of avoiding penalties for admitting to the presence of a disease, simply deny having it. When I first came to Canada, I delivered a presentation in Alberta in which I said that because the announcement of a disease outbreak was in many countries a political and not a scientific decision, some countries chose not to make such trade sensitive admissions to OIE, if it was thought they could eradicate the disease before it was widely recognized. We only hear of those attempts that were unsuccessful, of which there is now quite a long list. My audience was disbelieving that some politicians could be that dishonest. I was concerned that if my revelation reached the press that my stay in Canada could have been cut short.

For many years Australia was able to claim that it did not have bluetongue virus (BTV) on its territory, and could legitimately prevent imports from countries that had the virus. However, when it was discovered that BTV was present in the north of Queensland, it was reported as BT-like virus. Eventually it was shown that this BT like virus was in fact BTV, but then it was claimed that the BT disease did not exist in Australia. This was really because no sheep are kept in the area where the virus was present, and, of the domestic livestock, only sheep are susceptible to the disease. This changed when an enterprising research worker took some sheep to the north of the country, and they developed BT disease, much to the distress of the veterinary authorities, who then had to report it to OIE. A similar problem arose when Australian scientists isolated rabies virus from an indigenous bat species – this became universally known as rabies-like virus.

It is difficult not to be cynical about how the presence or absence of disease is used to justify trade decisions. The OIE provides guidelines for safe trading of animals and animal products between countries of different disease status, which, since OIE became the advisor to WTO on related trade disputes, have acquired greater and greater significance. However, countries can still ignore them if they can defend their decision by having carried out their own risk assessment. The OIE is very dependent on the honesty of their members in declaring their disease status, and has no punitive powers to punish those that are less than truthful. Ultimately, it is up to individual countries to protect their livestock industries from incursions of disease, but this is not easy when roses are given other names – or not named at all.

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A Vet Student Perspective by Jane Mancell

The Ministry of Agriculture Animal Health Centre (AHC) provides a rotation for final year veterinary students from the Western College of Veterinary Medicine (WCVM) to come to Abbotsford, BC and experience working for the government as a veterinary pathologist. This opportunity is beneficial to students that want more practice with pathology, are interested in becoming pathologists, will be practicing veterinary medicine in BC and those that may enter into government work following graduation. I began my rotation here February 13, 2012 and my experiences have been very positive thus far. My first day I was whisked into the necropsy room and set to work performing necropsies under the tutelage of the board certified veterinary pathologists on staff at the AHC. With the pathologists' guidance through the necropsies and the opportunity to read the pathology reports, this rotation has been a rewarding learning experience. As part of this rotation I also have a case report to write up and submit to the Canadian Veterinary Journal as an exercise in writing and publishing veterinary pathology articles. My time here at the AHC has been an excellent opportunity to investigate the role of a veterinary pathologist working in the government sector and to gain additional experience performing necropsies and collecting appropriate samples.

BC Hydro Substation Fire, CHILLIWACK - Milk Testing Results by Dr. Nancy deWith

The results of the testing, the literature review, and consultation with experts, all confirm that there was no risk to animal health

On the morning of Friday, 27 January 2012, a fire occurred at the BC Hydro and Power Authority Atchelitz substation on Lickman Road in Chilliwack, BC. The BC Ministry of Agriculture was notified that the transformer insulating oil used at that substation contained PCBs (polychlorinated biphenyls). Some of this oil was consumed in the fire, some was spilled into the environment, and some was contained on site.

As PCBs burn, they can convert into other chemicals, including PAHs (polycyclic aromatic hydrocarbons), dioxins and furans. These chemicals are lipophilic and will concentrate in fats; in dairy cows the chemicals will be excreted in the milk. Located within a 5 km radius of the Atchelitz substation are 33 dairy farms. Most of these farms are located to the north and west of the BC Hydro property.

Concern was raised that the animals may have been exposed to these chemicals either indirectly via environmental contamination, or directly through exposure to the smoke. Indirect animal exposure to chemicals from the fire could occur if particulate matter carried by the smoke is deposited onto pastures and is subsequently consumed by the animals. As well, some of the insulating oil escaped containment at the time of the fire, and was collected into a ditch system. Direct animal exposure could occur to animals that were in the smoke plume from the fire and inhaled chemicals. Milk samples were collected from the bulk milk tanks of six farms located downwind of the fire (northeast of the substation). The farms were selected based upon the farm owner/manager indicating whether smoke had passed over their property during the hours of the fire and clean-up.

In addition, control samples were collected from two farms located approximately 8.5 and 14.5 km upwind of the fire (southwest of the BC Hydro property).

The milk testing results (see table) show that there was no significant difference between the values from the affected (downwind) and the control (upwind) farms.

MILK testing results:

	Mean values		
	Affected farms -Downwind (n=6)	Control Farms -Upwind (n=2)	*p-value*
Dioxin-like PCBs (µg WHO-TEQ/kg lipid)	0.000134	0.000135	*0.3405*
Total PCBs (µg/kg lipid)	0.60	0.669	*0.4147*
PAHs (µg/kg)	0.61	0.71	*0.138*
Dioxins/furans (ng TEQ/kg lipid)	0.5	0.845	*0.3518*

The results of the testing, the literature review, and consultation with experts, all confirm that there was no risk to animal health (and public health through consumption of milk) through exposure to smoke from a fire such as occurred at the substation in Chilliwack, which was of relatively short duration, with relatively low amounts of PCBs.

Investigation into Causes of Pneumonia Related to Declining Populations of Killer Whales By Dr. Stephen Raverty

Preliminary Investigation Into The Microbial Culture And Molecular Screening Of Exhaled Breath And Pathogen Characterisation Of The Sea-Surface Microlayer (Sml) And Deep Water Samples In Southern Resident Killer Whales (Orcinus Orca) Transitting Puget Sound, Washington State

Within the Northeastern Pacific, there are three killer whale (*Orcinus orca*) ecotypes; the transients, southern residents/northern residents and offshores. Between 1989 and 2000, there was precipitous and unprecedented decline in the population of southern resident killer whales from 102 to 78 individuals. To place this decline in a global perspective, necropsy reports, published articles, and stranding records were reviewed and post mortem findings documented. Of 222 documented killer whale strandings between 1944 and 2003, histopathology and bacteriology were conducted on 46 (23 %) of the animals. Subacute to chronic pneumonia was the most common morphologic diagnoses in these animals (23/46) and in 14/23 (50%) whales the inflammation would have been sufficiently severe to account for the proximate cause of death. Primary pathogens included *Aspergillus* spp, *Candida* spp, *Erysipelothrix rhusiopathiae*, *Pseudomonas* spp, *Staphylococcus aureus*, zygomycetes and non-specific polymicrobial infections.

In order to better characterize potential pathogen burden, exposure and recruitment in resident killer whales, two preliminary field efforts were undertaken to collect exhaled blowhole air samples, as well as air surface microlayer (interface) and deep water samples for microbial analysis. Exhaled air samples were collected by positioning 4 inverted bacteriology plates secured to an 8 m long aluminum pole and passed through the exhaled plume over the blowhole of a surfacing whale. The plates (modified to be covered until collection) included: a sterile plate with no media, a blood agar plate, salt enriched tryptone soya agar (TSA) plate, and a Sabouraud (SAB) media plate. Once the exhaled air was collected, the sterile plate was aseptically swabbed and samples were inoculated on site into *Salmonella* enrichment media, fungal media and collected for polymerase chain reaction (PCR). For environmental samples, SML and 1 meter deep water was inoculated into TSA supplemented with 2% NaCl, TSA plain, Columbia Blood agar, selenite broth, SAB agar to quantify total and fecal coliforms and screen for *Salmonella* spp, *Pseudomonas aeruginosa* and *Clostridium* spp. PCR was employed to screen for dolphin and phocid morbillivirus, canine distemper virus, calicivirus, papillomavirus, marine mammal specific *Brucella* spp, *Mycoplasma* (Mollicutes), and universal herpesvirus. Swabs were then inoculated into Mabin Dawby and VERO cells and incubated for 3 weeks to assess for cytopathic effect.

Organisms recovered from 6 exhaled breaths include individual isolates of *Penicillium* sp, *Aureobasidium pullulans*, *Aureobasidium pullulans*, *Alternaria* sp, *Trametes versicolour*, *Penicillium brevicompactum*, *Cladosprium cladosporiodes*, *Pseudomonas fluorescens*, *Pencillium glabrum*, *Staphylococcus epidermidis*, *S pasteuri*, *S xylosus*, Bacillacae bacterium, *Staphylococcus* sp and *Rothia dentocariosa*. Isolates were initially identified biochemically, then by sequencing of 16s DNA. No growth was recovered in 3 animals, 1 week post sampling. Environment growth included *Vibrio tasmaniensis*, *Vibrio logei*, *Photobacterium* sp, *Vibrio* sp., *Moritella marina*, Bacillacae bacterium, *Macrococcus equipericicus*, Bacillus simplex, *Macrococcus caseolyticus*, *Hypocrea* sp, *Penicillium purpurogenum*, *Alternaria* sp., *Penicillium namyslowski*, *Psychrobacter immobilis*, *Burkholderia glumae*, *Burkholderia glumae*, *Vibrio wodanis*, *Exiguobacterium* sp, *Halomonas* sp., *Pseudoalteromonas haloplanktis*, *Aeromonas* sp., *Moritella* sp and *Photobacterium phosphoreum*, *Photobacter damselae*, *Burkholderia glumae*, *Vibrio logei*, *Pseudoalteromons arctica*, *Vibrio tasmamaniensis*, and *Pseudoalteromonas* sp. Interestingly, there were 4 environmental isolates of *Aspergillus fumigatus*, a recognized pathogen of multiple captive and wild marine mammal species. All samples were negative for screened pathogens by PCR and no cytopathic effect was detected in cell culture.

With expanding human population growth, industrial development and agricultural intensification particularly within south and central Puget Sound, Washington State, there are increased environmental stressors and perceived anthropogenic effects on killer whale populations which may impact reproductive performance, immune suppression and potentially predispose these animals to infectious disease. Although preliminary, these field investigations provide some baseline information into the commensal and environmental microbial flora of killer whales and the habitats they transit during each year, Puget Sound and the Georgia Basin.

These studies were conducted under NOAA Permit #965-1821-00 and WDFW Permit #06-322.

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Emerging Disease in Northern Europe: Schmallenberg Virus

By Kelly Liu, Veterinary Student

The outbreak

A new emerging virus, Schmallenberg virus (SBV), was identified in November 2011 at the Friedrich Loeffler Institute (FLI), the German federal animal health laboratory. The disease was first seen in the summer of 2011 in Germany in dairy cows that displayed symptoms of fever, poor body condition, inappetence, and reduced milk production.

Distribution of SBV by the end of December 2011. Map produced using EMPRES-i, Global Animal Disease Information System <http://empres-i.fao.org/eipws3g/#h=0>

Distribution of SBV by the end of April 2012. Map produced using EMPRES-i, Global Animal Disease Information System <http://empres-i.fao.org/eipws3g/#h=0>

Since then, hundreds of cases in sheep, cattle and goats have been found with similar signs. Some affected animals also have severe diarrhea. The symptoms in adult animals are self-limiting, but have led to abortions, stillbirths and congenital malformations in newborns of animals infected during gestation. The malformations include arthrogryposis, jaw deformities, torticollis, and dome-shaped head (predominantly seen in newborn lambs). Neurological signs were also observed: ataxia, blindness and inability to suckle.

The virus has now spread through other countries in northern Europe (the Netherlands, France, Belgium, Luxembourg, UK, Italy and Spain) and caused detrimental losses to their livestock.

So far, there has been no evidence of transmission of SBV from ruminants to humans.

The Schmallenberg virus

Schmallenberg virus belongs to the family *Bunyaviridae*, within the *Orthobunyavirus* group. This virus and other viruses in the same group had never been identified in Europe before.

Testing

Currently, pathogen testing in Europe is being done using real time polymerase chain reaction (RT-PCR) or virus isolation. Antibody detection is by direct immune-fluorescence or virus neutralization testing.

It is hypothesized that SBV can be transmitted by arthropods vectors (Lievaart-Peterson, et al., 2012). As the activities of the arthropods are typically seasonal, SBV infection would likely follow such seasonal peaks. Researchers in Belgium have detected SBV in three species of biting midges (*Culicoides obsoletus*, *C. dewulfi*, and *C. pulicaris*) as part of their bluetongue virus surveillance project (Anonymous, 2012).

Implication for Canada

In North America, *Culicoides* sp. are widespread, and one of the three species of *Culicoides* identified as possible vectors for SBV, *C. obsoletes*, is known to occur in British Columbia in the Okanagan Valley, central interior and the Fraser Valley (Anderson, 1992). If the virus is brought to North America the disease will likely be able to propagate. The Canadian Food Inspection Agency (CFIA) has released new importation measures to prevent the entry of SBV into Canada. As of April 27, 2012 "all animals must test negative for SBV before their embryos or semen can enter Canada from the European Union."

References and further information:

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Kupferschmidt, K. 2012. Scientists rush to find clues on new animal virus. *Science*, vol. 335, no. 6072, pp. 1028-1029.

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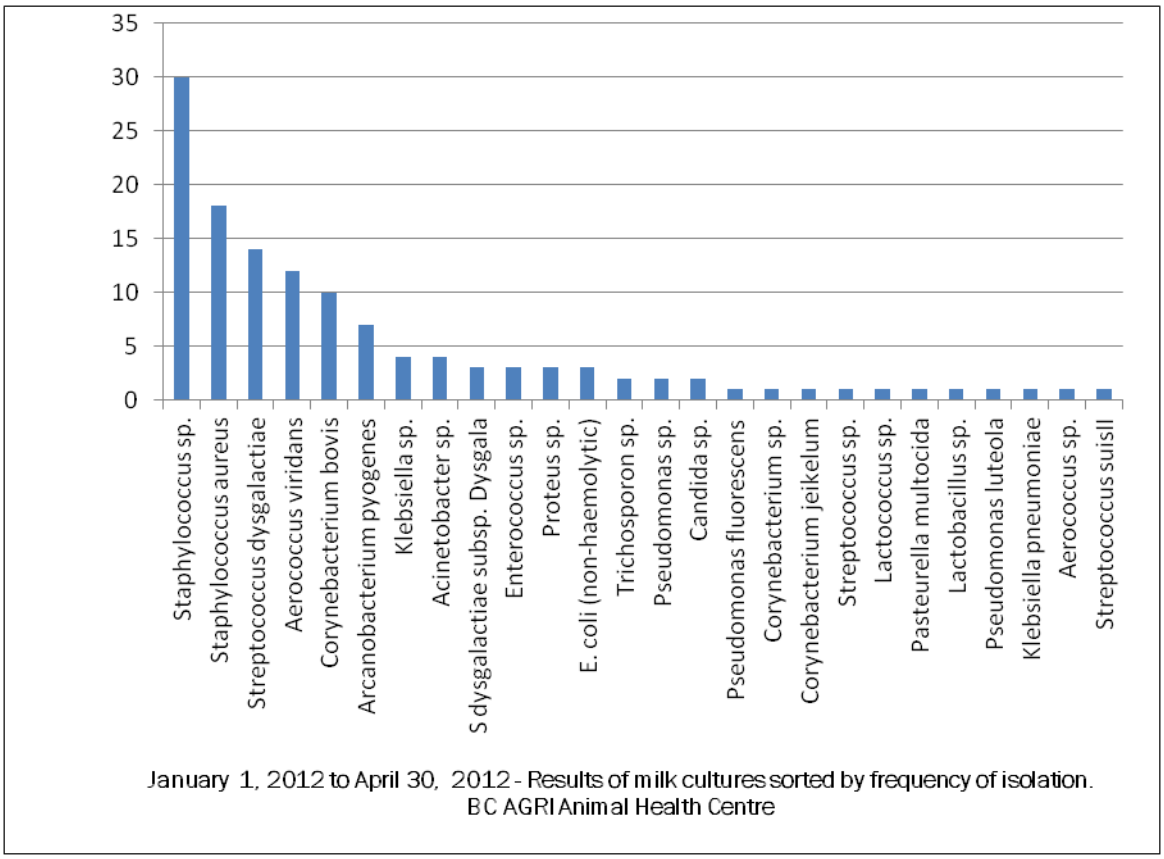
Mastitis Culture Results by Dr. Jane Pritchard



January 1, 2012 to April 30, 2012 - Results of milk cultures sorted by frequency of isolation.
BC AGRI Animal Health Centre

Between January 1 and April 30, 2012, 219 milk samples (39 submissions) were received for culture and sensitivity at the Animal Health Centre. Out of the 219 samples submitted, no bacteria were isolated in 123 samples.

The resistance results of the 5 most frequently isolated organisms in the first quarter of 2012 are presented in the chart below.

Resistance by Isolate										
	amp	kf	ob	e	xnl	p10	pyr	sxt	tet	# of isolates tested
Staphylococcus sp.	10%	0%	13%	7%	3%	13%	20%	3%	10%	30
Staphylococcus aureus	6%	0%	0%	0%	0%	11%	6%	0%	6%	18
Streptococcus dysgalactiae	0%	0%	0%	0%	0%	0%	0%	0%	14%	14
Aerococcus viridans	0%	0%	25%	0%	0%	0%	17%	17%	42%	12
Corynebacterium bovis	0%	0%	20%	0%	0%	0%	0%	0%	0%	10

amp – ampicillin	ob – cloxacillin	xnl – excenel	pyr – pirlimycin
kf – cephalothin	e – erythromycin	p10 – penicillin	tet – tetracycline

Staff Profile: Ken Sojonky

In 2000 Ken joined the Molecular Diagnostics Section of the Animal Health Centre (AHC) where his work includes research and development of new and existing polymerase chain reaction (PCR) assays for detection of and extensive range of animal pathogens. Ken continues to enjoy many aspects of his work - not only the various demands generated within a veterinary laboratory setting - but also those arising in the growing and ever-evolving role of molecular biology.

Ken brings valuable knowledge and experience to his role in molecular diagnostics at the AHC. In addition to performing routine PCR testing, it's noteworthy that Ken recently developed a very significant test to differentiate Infectious Bronchitis (IB) poultry viruses. This will allow the tailoring of IB vaccines for individual geographic areas where a particular IB variant virus is predominating. The technique involves the use of a nucleic acid-based sequence detection system. The only other laboratory in Canada performing this test is at the U of Guelph.

The Molecular Diagnostics Section contributes significantly to the AHC's diagnostic arsenal. DNA identification of various infectious agents via the PCR technique has, without exaggeration, revolutionized the ability of diagnostic laboratories to identify a host of important yet fastidious infectious organisms known to cause infectious disease in animals.

A native of Regina, Saskatchewan, Ken completed his BSC degree in biochemistry from the U of Victoria. Following graduation he worked as a laboratory instructor in the Microbiology Department, where he taught undergraduate students. He then

worked for three years at the U of Victoria's Centre for Environmental Health, a cancer research facility, where he studied the mutagenic effects of agents in food and the environment utilizing advanced techniques in molecular biology; these included the PCR procedure and nucleic acid sequencing.

Together with his wife and their three children, Ken enjoys an active life outside the work environment that includes tennis, skiing and support of local youth athletics.

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