

Animal Health Monitor

MARCH 2012



Articles of Interest:

- **Diseases other than sea lice affect wild juvenile pink salmon in BC**
- **Preliminary results of Johne's testing**

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Editorial by Dr. Paul Kitching

Science and spin

Reports in the media of scientific breakthroughs tend to be sensational and simplistic, focusing on a conclusion that even if it can be confirmed will likely require another five, ten or even twenty years of research to achieve, and even then, will probably not deliver what was originally hoped for. The reporting of stem cell research results and cold fusion would be good examples.

Less significant, but of importance to British Columbia, has been media interpretation of the science presented to the Cohen Commission, which has been investigating the collapse of the sockeye salmon population in the Fraser River. The particular piece of science is whether Infectious Salmon Anemia Virus (ISAV) or disease (ISA) has been found in British Columbia salmon. The reporters and bloggers covering the subject often have little understanding of biological processes associated with modern diagnostic technology, and consequently their ability to assess the credibility of the evidence is not science based, but seems to have more to do with the celebrity of the individual giving the evidence rather than the science behind the reported results. The motivated amateur dedicated to saving the

wild salmon, or the lone scientist, shunned by her or his colleagues has been sympathetically reported, while the fully accredited government scientist, with years of specialized and relevant experience is called an industry lackey, and should be treated with suspicion.

The exception is the internationally recognized scientist who first made the diagnosis of ISA in wild Pacific salmon sent from BC. To those of us who are familiar with modern veterinary diagnostic tests, the positive tests raised a number of questions concerning the protocol and procedures used, not least because the BC provincial laboratory had been unable to find any evidence of the virus over many years of testing both farmed and wild salmon, and also because wild Pacific salmon are thought not to be susceptible to the virus. These concerns were also shared by the Canadian Food Inspection Agency (CFIA), who, as the competent authority for Canada, is responsible for the surveillance of diseases such as ISA. ISA has trade consequences, and CFIA is responsible for reporting confirmed positive results to the international community. CFIA is also responsible for ensuring the quality of the



diagnostic procedures used in Canada to look for ISA virus in a diagnostic specimen. The first diagnosis of ISAV was made in a laboratory designated by the World Animal Health Organization (OIE) as a reference laboratory, but few people seemed to understand that the diagnostic competence of the laboratory was not the responsibility of OIE, which neither inspects nor financially supports its reference laboratories, but that of CFIA.

Only recently have certain fish diseases, such as ISA, been made internationally reportable, in the same way as foot and mouth disease or avian influenza have been for many years. While CFIA has retained the diagnostic capability for reportable terrestrial diseases, and only recently certified some provincial laboratories to carry out their diagnosis using CFIA derived protocols and test reagents, the Agency has not taken on the diagnosis of internationally reportable fish diseases, leaving this with designated laboratories in the Department of Fisheries and Oceans (DFO).

Continued on page 2

Science and Spin (continued)

CFIA has not yet finalized protocols of their own, nor have Agency auditors systematically assessed the diagnostic competence of the laboratories doing their tests. So it was in retrospect that CFIA inspected the OIE reference laboratory for ISA. The report of the audit was presented as evidence to the Cohen Commission, and it clearly identified practices that would not be acceptable in a fully ISO17025 or equivalent accredited laboratory, because they provide ample opportunity for cross contamination of samples and false positive results. The test being used was the Polymerase Chain Reaction (PCR), which is so exquisitely sensitive that each procedure must be conducted in different rooms within the laboratory to prevent positive control samples or previous positives from con-

taminating the test. This practice was not being used in the OIE reference laboratory. Even the same pipettes were being used for positive and test material. The OIE reference laboratory was also unable to grow any ISAV from the submitted material, which is an OIE requirement for a positive identification of the virus. Samples from BC wild salmon were also tested at a laboratory in Norway and the local DFO laboratory in Nanaimo, and although both laboratories reported some suspicious PCR tests, neither was able to confirm their results. In fact, the DFO laboratory was using a non validated procedure at the extreme of the limit of detection. It would be expected that if ISAV was as widely distributed as claimed, some of the submitted samples would have sufficient virus present to provide a non

equivocal result.

Audits are a normal part of certifying the quality of any diagnostic laboratory. However, when the CFIA audit of the OIE reference laboratory for ISA was presented, the media failed to give it credibility, characterizing it as a witch hunt to suppress information that would embarrass the federal and provincial governments.

Is it possible that the poorly resourced OIE reference laboratory was wrong in its identification of an ISAV-like virus in BC, and that the anti fish farm lobby groups, supported by the ill informed media and bloggers, are fabricating a scare story to get public support to demonize fish farms as the source of the virus, and to increase the number of readers? I must be a conspiracy theorist even to think such a thing.

Reports in the media of scientific breakthroughs tend to be sensational and simplistic, focusing on a conclusion that even if it can be confirmed will likely require another five, ten or even twenty years of research to achieve, and even then, will probably not deliver what was originally hoped for.

Diseases other than sea lice affect wild juvenile pink salmon in BC by Dr. Gary Marty

A multidisciplinary research team, including four Plant and Animal Health Branch staff, recently identified poor growth and liver lesions as health indices that might contribute to poor marine survival of wild pink salmon (Saksida et al. 2012). The study sampled juvenile pink salmon in the Broughton Archipelago region of BC in 2007 and 2008. Adult returns of the 2007 cohort were the lowest on record (which date back to the 1940s), whereas adult returns of the 2008 cohort were the fourth highest on record.

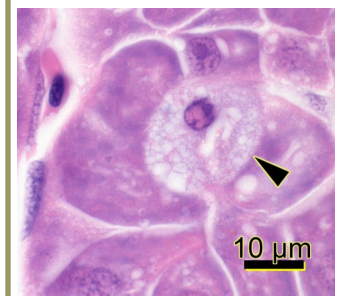
Juvenile pink salmon weighed 35% less in June 2007 than in June 2008, and small size is a risk factor for increased susceptibility to predation. Peak monthly

prevalence of hepatocellular hydropic degeneration was greater in 2007 (32%, in May) than in 2008 (12%, in June). This liver lesion is an indication that the fish were being exposed to toxins. The source of the toxin was thought to be the food because farm salmon sampled in the region during the same time did not have hepatocellular hydropic degeneration. Farm salmon breathe the same water as wild fish, but farm salmon eat processed feed rather than wild food from their environment.

An interesting finding was that the odds of fish with hepatocellular hydropic degeneration having sea lice was two to three times greater than for fish without

hepatocellular hydropic degeneration. Therefore, field studies that have attributed pink salmon mortality to sea lice—without assessing the presence of other lesions or infectious agents—might instead have been measuring the effects of hepatocellular hydropic degeneration.

Saksida, S.M., G.D. Marty, S. St-Hilaire, S.R.M. Jones, H.A. Manchester, C.L. Diamond, and J. Bidulka. 2012. Parasites and hepatic lesions among pink salmon, *Oncorhynchus gorbuscha* (Walbaum), during early seawater residence. *Journal of Fish Diseases* 35:137-151.



The arrowhead points to a hepatocyte with hydropic degeneration.



phalaris spp. grass
(specifically *Phalaris arundinacea* (reed canarygrass) found in BC.

from [http://
linnet.geog.ubc.ca/Atlas/
Atlas.aspx?](http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?)

For more information
about the project
please contact Dr.
Brian Radke,
brian.radke@gov.bc.ca,
604-556-3066, or toll-
free 1-877-877-2474.

To schedule sample
submission and order
sampling materials
please contact
Rosemary Pede,
rosemary.pede@gov.bc.ca
604-556-3065, or toll-free
1-877-877-2474.

Suspected *Phalaris* spp. Intoxication in a Herd of Sheep

by Dr. Chelsea G. Himsworth

History: In July 2011, a herd of sheep from the Kelowna area was afflicted by a progressive neurological disease. Affected animals were unable to stand and their back legs were held out in rigid extension. The animals would go on to die and the producer estimated that 4-5 animals had died in this manner over the preceding 4-6 weeks. The producer euthanized two affected sheep and submitted them to the Animal Health Centre.

Post mortem findings: Both sheep had extreme extension and rigidity of the hind legs but there were no other obvious abnormalities on gross post-mortem. On microscopic examination of the brain stem, neurons contained an abnormal dark-brown, granular pigment.

Diagnosis: The clinical presentation, in combination with the pigment in the neurons, was suggestive of *Phalaris* spp. intoxica-

tion. Several species of *Phalaris* spp., (often known as canarygrass) are known to be toxic for sheep and other herbivores. Animals may die suddenly or may develop neurological disease including tremors, stiffness, collapse and seizures, prior to death. The most consistent finding in cases of *Phalaris* spp. intoxication is granular pigment within the neurons of the brain stem, as was observed in this case. Clinical disease can occur immediately after ingestion of the plant or may be delayed for several months.

Phalaris spp. toxicity has been reported in multiple locations around the world. Although there have been no reported cases of *Phalaris* spp. intoxication in BC, this non-descript grass is common throughout southern-areas of the province. Unfortunately, we were unable to determine if this herd had been exposed to *Phalaris* spp. The herd was sold soon after the

diagnosis was made, and although the new owner reported that animals continued to be affected, s/he subsequently ceased contact with the laboratory.

Discussion: Plant intoxications can be very difficult to diagnose for a variety of reasons including the fact that: 1) the clinical disease and post-mortem lesions are often minimal and non-specific, 2) there are no laboratory tests to diagnose plant intoxications, 3) it can be difficult to determine which plants pastured animals consume, and 4) it is very difficult for non-experts to identify toxic plants, particularly grasses. For these reasons it is likely that many plant-related intoxications in animals go undiagnosed. In any case where plant intoxication is suspected, a diagnosis is best achieved through cooperation among the producer, attending veterinarian, and pathologist.

Preliminary Results of BC's Johne's Disease Project

by Dr. Brian Radke

From September 1, 2011 to January 23, 2012 8,205 samples had been received for Johne's Disease testing, as part of BC's Johne's Disease Project. Forty-seven beef herds contributed 6,545 samples and 1,711 samples came from 11 dairy herds. A bison herd also submitted samples. Testing is still underway for a number of samples. Forty-five herds (34 beef and 11 dairy) have some or all of the Johne's testing completed. Among those 45 herds, 12% (4 of 34) of the beef herds and 27% (3 of 11) dairy herds had at least one animal test positive for Johne's Disease. Among the test positive herds, 3% or less of the sampled animals tested positive. However, Johne's testing underestimates the level of disease, so positive herds are expected to have more positive animals in the herd.

As of January 23, 2012 3,642 samples had been received for BVD testing. Twenty-eight beef herds contributed 2,205 samples and 1,437 samples came from 9 dairy herds. The BVD testing is complete for all the samples and all were negative (that is, no persistently infected animals were identified).

The Johne's Disease Project continues to accept samples for Johne's testing and optional BVD testing. There is no laboratory cost for the project testing. For more information about the project please contact Dr. Brian Radke, brian.radke@gov.bc.ca, 604-556-3066, or toll-free 1-877-877-2474. To schedule sample submission and order sampling materials please contact Rosemary Pede, rosemary.pede@gov.bc.ca, 604-556-3065 or toll-free 1-877-877-2474.

Combatting *Salmonella* Enteritidis (SE) in BC

by Dr. Mira Leslie, Dr. Bill Cox and Dr. Nancy deWith

In BC, Growing Forward has provided resources to coordinate a major effort to improve the control of *Salmonella* Enteritidis (SE) using integrated farm management and multidisciplinary approaches. SE infects the gut and reproductive tract of poultry without causing any signs in the bird. It can be transmitted from infected hens to their chicks through the egg. It is hardy environmentally and can be spread and maintained by rodents. SE is not a reportable disease in animals as it is in humans. The Egg Marketing Board oversees routine testing and control of SE in registered table egg layer flock environments.

Prior to 2007, SE was rarely isolated from submissions to the Animal Health Centre laboratory. Starting in 2008, SE has been identified in samples from CFIA's *Salmonella pullorum/gallinarum* monitoring program in hatcheries, diagnostic poultry submissions, and occasionally from mammalian submissions. Tackling SE in BC became an important focus in 2007 when public health reports showed SE emerging as a significant and ongoing cause of illness in British Columbia residents.

Since November 2009, Growing Forward has provided funding to improve SE control on farms in BC under a

project titled Aligning Public Health, Animal Health, Poultry and Egg Producers to address Food Safety Goals. The project goal is to improve communication and coordination among stakeholders in food safety, and to promote the development and implementation of measures to reduce SE in BC's poultry populations.

To date, the project has provided support for several accomplishments and significantly heightened awareness among poultry production sectors about the importance of SE as a risk to public and animal health.

The BC Broiler Hatching Egg Commission and its constituent farmers have:

- worked closely with veterinarians to implement vaccination protocols for broiler breeder flocks
- initiated a SE steering committee
- prohibited farm gate sales
- strategically implemented on farm sampling
- performed trace backs from contaminated hatchery fluff
- Enhanced flock management
- hired professional pest controllers to do farm audits, developed and implemented a cleaning and disinfection protocol for infected premises

Additionally, hatcheries have improved biosecurity around the handling of breeder chicks.

Knowledge across disciplines has broadened as Board leaders have met several times with public health in provincial and national meetings. BC has led initiatives to coordinate SE control efforts with other provinces that have identified similar trends. In February 2010, Growing Forward sponsored an interdisciplinary workshop on SE in poultry in Abbotsford for the western provinces. As part of the action plan from that workshop, BC's animal and public health staff formed a national interagency (public/private) steering committee to organize the Canadian *Salmonella* Enteritidis Control Symposium and Workshop, (Vancouver, December 2010). This event included a facilitated interdisciplinary workshop of experts and a subsequent report that outlined and prioritized goals and recommendations for SE control. A national SE control workgroup has been established to move the work forward.

All of these efforts combined utilize the best science available for this pathogen and population. Disease and pathogen control is a constant challenge and the farming community is diligently working to improve animal health and food safety.

The symposium presentations are available at this link:

http://www.bccdc.ca/dis-cond/a-z/_s/SalmonellaInfection/SalmonellaSymposium.htm

Helcococcus ovis by Sean Byrne Ph.D., Head of Bacteriology

Since 2008, the AHC bacteriology laboratory has isolated an unusual emerging pathogen from three bovine submissions. These were detected as very slow growing pinpoint colonies of gram positive cocci which we identified as *Helcococcus ovis* by 16S ribosomal sequencing. These organisms were isolated from a lung abscess of a one month old calf, a cheek abscess from a three month old Holstein calf and most recently a milk specimen from a Holstein dairy cow. In addition *Mannheimia haemolytica* and *Pasteurella* sp. were recovered from the first specimen, *Arcanobacterium pyogenes* was co-cultured from the third whereas no other aerobic or anaerobic organisms were isolated from the second.

The genus *Helcococcus* was proposed by Collins in 1993 (2), at which time *H.kunzii* was the sole species. *H.kunzii* is considered to be normal human skin microflora and has been associated with infection of surgically implanted

devices, skin infections, abscesses and septicaemia. There has been one reported case of *H.kunzii* urocystitis in a sow (4).

H.ovis was first described in 1999 (3), when it was recovered from an ovine post-mortem lung, liver and spleen tissue and from the milk of an ewe with subclinical mastitis. *H.ovis* has not yet been reported to cause infection in humans however it has been associated with a variety of infections of different animals often mixed with other organisms. **Kutzer examined cases of bovine valvular endocarditis and found *H. ovis* to be present in 18 of 55 cases, in 16 of these *H.ovis* was the sole organism isolated.** Histological examination of these culture positive tissues revealed multifocal aggregates of gram positive cocci (5). *H.ovis* has also been associated with pleuritis and bronchopneumonia in sheep, a pulmonary abscess in a horse and has been detected in bovine milk.

Antimicrobial susceptibility testing based on minimum inhibitory

concentrations (MIC) revealed 10% of strains were resistant to erythromycin and 83% were tetracycline resistant. Although, *H.ovis* appears to be susceptible to penicillin, ampicillin, amoxicillin-clavulanic acid, and cephalothin (1), therapeutic failure may follow appropriate treatment possibly due to the inability of the drug to penetrate abscesses (6).

Because of their slow growth and fastidious nutritional requirements, care must be taken to ensure optimal laboratory detection. Laboratories must extend the incubation period of plates and may include a "Staph streak" to detect these organisms. **Practitioners should inform the laboratory of suspected endocarditis or pulmonary disease and may request extraordinary culture methods for the detection of *H. ovis*.**

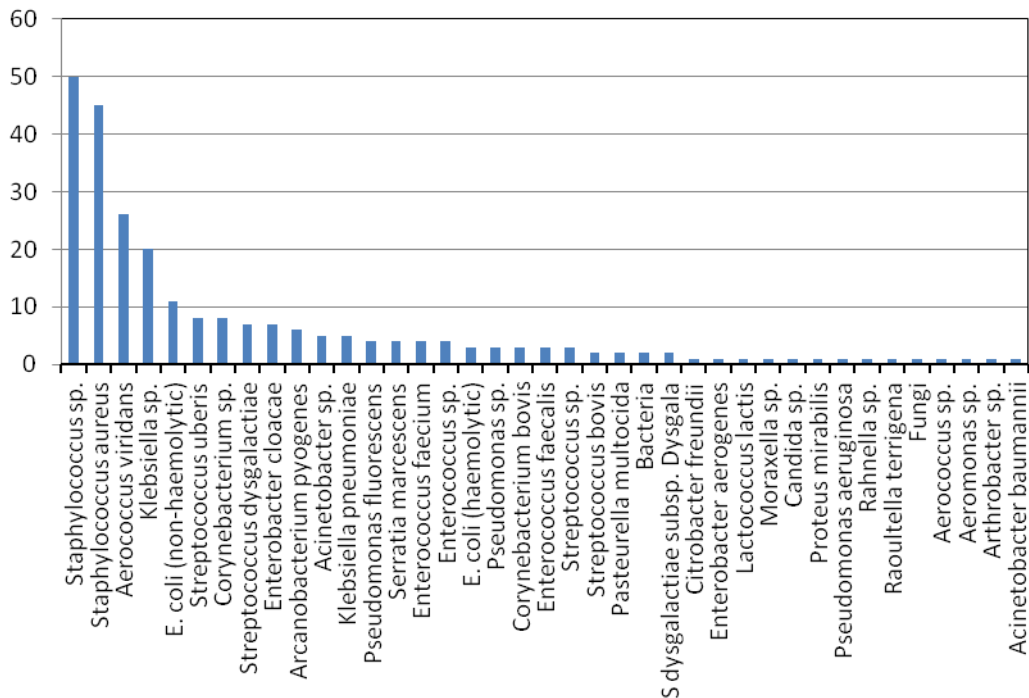
H.ovis is an emerging pathogen which appears to have significant pathology. With increased laboratory awareness and detection we expect to gain more insight into its pathological significance.

Kutzer examined cases of bovine valvular endocarditis and found H. ovis to be present in 18 of 55 cases, in 16 of these H.ovis was the sole organism isolated.

Reference List

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Mastitis Culture Results by Dr. Jane Pritchard



January 1, 2011 to December 31, 2011 - Results of milk cultures sorted by frequency of isolation.

Between January 1 and December 31, 2011, 1113 milk samples (100 submissions) were received for culture and sensitivity at the Animal Health Centre. Out of the 1113 samples submitted, no bacteria was isolated in 627 samples.

The resistance results of the 5 most frequently isolated organisms in 2011 are presented in the chart below.

| Resistance by Isolate | amp | kf | ob | e | xnl | p10 | pyr | sxt | tet | # of isolates tested |
|--------------------------|------|-----|------|------|-----|------|------|-----|-----|----------------------|
| Staphylococcus sp. | 38% | 0% | 14% | 4% | 0% | 36% | 26% | 4% | 12% | 50 |
| Staphylococcus aureus | 11% | 0% | 2% | 2% | 0% | 11% | 2% | 0% | 2% | 45 |
| Aerococcus viridans | 0% | 4% | 54% | 12% | 4% | 0% | 19% | 50% | 46% | 26 |
| Klebsiella sp. | 105% | 35% | 100% | 100% | 20% | 100% | 100% | 5% | 45% | 20 |
| E. coli (non-haemolytic) | 64% | 64% | 100% | 100% | 18% | 100% | 100% | 9% | 27% | 11 |

| | | | | |
|------------------|------------------|------------------|--------------------|-------------------------------------|
| amp - ampicillin | ob - cloxacillin | xnl - excenel | pyr - pirlimycin | sxt - sulfamethoxazole/trimethoprim |
| kf - cephalothin | e - erythromycin | p10 - penicillin | tet - tetracycline | |



Pacific Agriculture Show, January 26-28, 2012

The Ministry of Agriculture was represented by staff from the Plant and Animal Health Branch, Sustainable Agriculture Management Branch and the Food Protection Branch, at the Pacific Agriculture Show. The 3 day event was attended by approximately 10 000 visitors and there were 232 booths.

Ministry staff from left to right: Maria Jeffries, Plant Health; Erin Zabek, Animal Health; Debi Sand, Animal Health; Mark Raymond, Sustainable Agriculture Management Branch and Elsie Friesen, Food Protection Branch.



Animal Health Centre
1767 Angus Campbell Road
Abbotsford BC V3G 2M3

Toll free (BC only):
1-800-661-9903
Phone: 604-556-3003
Fax: 604-556-3010

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<http://www.agf.gov.bc.ca/ahc/AnimalHealthMonitor.html>

Send correspondence to: Debra Sand

Email: debra.sand@gov.bc.ca
Phone: 604-556-3023
Fax: 604-556-3015

To receive this newsletter electronically, contact Lynette.Hare@gov.bc.ca