Laboratory Services Division
Animal Health Laboratory
University of Guelph
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AHL Newsletter

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In this issue:

Specimen packaging videos *Melanie Barham, Michael Deane*

New! Refresher videos for clinics submitting to the AHL.

After taking samples from your patient, you want to ensure your samples arrive in optimal condition to maximize the accuracy of your lab testing. The AHL is pleased to present a series of short videos for vets and staff who submit to AHL on our new YouTube channel. The videos feature handy tips on practical packaging of samples, as well as tips on avoiding sample degradation in transit. The videos are less than 2 minutes each, and can be accessed from any smartphone, laptop, or device with internet connection.

Check out the AHL YouTube channel now. https://www.youtube.com/channel/UC496n8JfABRI4l3eBgxzfTQ

Topics include:

- ◊ *Properly using a Whirl-Pak bag*
- ◊ *Packaging a large fixed tissue sample*
- ◊ *Packaging and shipping formalin-fixed tissues*
- ◊ *How to ship blood tubes*
- ◊ *Packaging multiple samples*

More to come! *AHL*

Serologic evaluation – acute and convalescent titer testing at the AHL *Jim Fairles*

Serologic tests can play an important role in determining immune status or exposure of an animal to a particular disease agent. A four-fold (4X) rise in titer between acute and convalescent samples denotes seroconversion and is used as an aid in diagnosis. **VN (virus neutralization)** or **HI (hemagglutinin inhibition)** tests are biological tests and require time to complete. Samples received by Wednesday are set up and read the following week.

Acute and convalescent samples must be run and compared simultaneously.

Please make sure that acute samples are marked as such when sent to the AHL and whether a convalescent sample will follow. It is always best to hold the acute sample back in the clinic and send both at the same time. If aware, we will store acute samples until the convalescent sample is sent 3-4 weeks later. **Please remember that the AHL charges for each VN test**, e.g., if 5 animals require 5 VN tests (both acute and convalescent) this will result in 50 tests being charged (5 X 5 X 2). Please remember the costs when developing your testing plan. *AHL*

Premises identification (PID) *Jim Fairles*

Premises identification (PID) is vital to allowing **traceability** of animals throughout the agri-food chain, is a foundation of various Canadian animal identification programs, and is becoming mandatory in more circumstances, e.g., http://bit.ly/1OAEg38

"As of July 1, 2014 all movements of swine need to be reported to PigTrace Canada." "Registering with the Ontario Provincial Premises Registry (PPR) to get a premises ID (PID) is easy, free and voluntary."

PIDs have been used, and proved useful, in various recent disease situations, e.g., tracking PED (porcine epidemic diarrhea) cases in the recent outbreak, and in ongoing swine ARC&E (Area Regional Control and Elimination) programs for PRRSV and PEDV.

Use of PIDs is mandatory in the new round of OAHN projects (see p. 5, this issue).

From the Dairy Farmers of Ontario website: http://bit.ly/1UoFsOl "... 94% of commercial dairy operation premises are identified in Canada. "

We strongly encourage entering PIDs on all AHL submissions. *AHL*

Selected AHL outreach presentations, 2015

- ◊ **Barham M**. DSP and OAHN. OLPC - Ontario Livestock and Poultry Council, Guelph, ON. April 10, 2015.
- ◊ **Brash M, Martin E,** Turner P. Postmortem wet lab for the OAHN mink workshop for veterinarians, PAHL, U of Guelph, Guelph, ON, April 11, 2015.
- ◊ **Brooks A.** Poultry health update. OMAFRA Poultry Producer Update, St. Isidore, ON, Nov 2015.
- ◊ **DeLay J, Ruotsalo K**. Lunch with AHL pathologists—Getting the most for your diagnostic dollar. Annual OVMA Conference, Toronto, ON, Jan 30, 2015.
- ◊ **Fairles J**. AHL update presentation at the Centralia Swine Research Update, Centralia, ON. Jan 28, 2015.
- ◊ **Fairles J**. AHL bovine respiratory virology submissions update at 2 Merck Veterinary practitioner meetings (eastern and southwestern Ontario) June 17-18, 2015.
- ◊ **Fairles J**. AHL emergency management and procedures update at the Equine Foreign Animal Disease Simulation workshop. Campbellville, ON. June 23, 2015.
- ◊ **Fairles J**. AHL avian influenza outbreak procedures and experiences at the North American AI symposium. Am Assoc Vet Lab Diagn, Providence RI. Oct 22, 2015.
- ◊ **Fairles J**. AHL milk bacteriology update at Picton AH producer meeting. Picton ON. Oct 29, 2015.
- ◊ **Maxie G**. OAHN update, Ontario Livestock and Poultry Council, Guelph, ON, Aug 14, 2015.
- ◊ **Maxie G, Barham M**. Disease Surveillance Plan and Ontario Animal Health Network. “Staying ahead of the curve”, 3rd annual DSP stakeholder mtg, Guelph, ON, Oct. 1, 2015.
- ◊ **McEwen B**. Veterinary Forensic Pathology I: State of veterinary pathology and a precedent setting case (Invited). Can Assoc Vet Pathologists, Annual Meeting, Saskatoon, SK. June, 2015
- ◊ Ouckama R, **Brash M, Barham M**. Ontario poultry health update, 2015 Poultry Producer Updates, OMAFRA & PIC, Brodhagen, ON. Dec 9, 2015
- ◊ **Slavic D**. HIPRA International Mastitis Course, Guelph, ON, Oct. 6, 2015.
- ◊ **Spinato MT**. "Update on small ruminant adult mortality project". SRVO, Small Ruminant Veterinarians of Ontario, Fall Continuing Education Mtg, Alliston, Oct. 28, 2015.
- ◊ Weber L, **Brash M**. Update on small poultry flock health and disease. Henstock II. Eden, ON. Nov 7, 2015.

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March, 2016 - Volume 20, Number 1

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The *AHL Newsletter* is published quarterly (March, June, September, December) by the Animal Health Laboratory, Laboratory Services Division, University of Guelph.

Its mission is to inform AHL clients and partners about AHL current activities, and laboratory-based animal disease events and disease trends.

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Our continued thanks to all of the non-author AHL clerical, technical, and professional staff who contribute to the generation of results reported in the AHL Newsletter.

Selected zoonotic pathogens and diseases from Ontario identified at the AHL, 2015

Beverly McEwen, Durda Slavic, Davor Ojkic, Josepha DeLay, Hugh Cai, Margaret Stalker, Murray Hazlett, Andrew Brooks, Kristiina Ruotsalo, Jan Shapiro

Many new, emerging, and re-emerging diseases of people are caused by pathogens originating from animals, or are shared between people and animals. The AHL plays an important role in public health by identifying zoonotic pathogens in ~1,000 cases annually (Tables 1 and 2). As well, *Echinococcus multilocularis* was identified in 2 non-domestic animals from the same location and one dog. These are numerator data reliant upon submission biases to the diagnostic laboratory and cannot be regarded as population prevalence estimates. Monitoring programs are not included. *AHL*

Table 1. Cases with selected zoonotic pathogens isolated and/or identified at the AHL, 2015

Agent	Bovine	Swine	Equine	Ovine	Caprine	Chicken	Turkey	Canine	Feline	Other	2015	2014	2013	2012	2011	2010
Ascarids (*T. canis, T. cati, T. leonina, Baylisascaris* sp.)	0	0	0	0	0	0	0	13	4	0	**17**	**40**	36	35	ND	ND
Blastomyces dermatitidis	0	0	0	0	0	0	0	15	1	5	**21**	**22**	17	10	10	5
Bordetella bronchiseptica	0	16	5	0	0	0	0	7	3	6	**37**	**28**	24	33	43	54
***Borrelia burgdorferi* (Lyme disease), serology**	0	0	03	0	0	0	0	5	0	0	**8**	**12**	11	3	1	
Brucella sp. (non-abortus)	0	0	0	0	0	0	0	0	0	0	**0**	**1**	0	0	0	0
Campylobacter coli/ jejuni/ fetus subsp. fetus	2	1	0	4	0	6	0	1	2	1	**16**	**17**	6	17	12	24
***Chlamydia* sp. (*C. abortus*, except 1 *C. psittaci* in a bird)**	0	0	0	9	13	0	0	0	0	2	**24**	**15**	25	33	39	58
Clostridium difficile	1	6	2	0	0	0	0	1	0	0	**10**	**11**	11	19	40	31
***Coxiella burnetii* (Q fever)**	4	0	0	16	24	0	0	0	0	0	**44**	**55**	28	36	99	115
***Cryptococcus* sp.**	0	0	0	0	0	0	0	0	1	0	**1**	**3**	2	1		
***Cryptosporidium* sp.**	222	2	0	6	12	0	0	0	0	5	**247**	**186**	206	141	147	157
Eastern equine encephalitis virus	0	0	5	0	0	0	0	0	0	1	**6**	**25**	1	0	5	12
Giardia sp.	10	0	0	0	0	0	0	18	2	0	**30**	**50**	48	26	31	60
Listeria monocytogenes	3	0	0	5	3	0	0	0	0	1	**12**	**23**	15	18	18	19
Methicillin-resistant *Staphylo-coccus aureus* (MRSA)	0	1	24	0	0	0	0	2	1	0	**28**	**17**	8	24	49	74
Methicillin-resistant *S. pseudintermedius* (MRSP)	0	0	0	0	0	0	0	87	1	0	**88**	**45**	141	114	192	ND
Rabies	0	0	0	0	0	0	0	0	0	0	**0**	**0**	0	0	0	3
Salmonella enterica	71	98	3	3	0	45	48	7	1	56	**332**	**221**	308	281	256	256
Streptococcus suis	22	132	3	3	3	0	0	0	3	1	**167**	**105**	126	144	106	110
Streptococcus equisimilis	3	16	12	1	5	1	0	3	0	7	**48**	**4**	34	45	59	48
Streptococcus zooepidemicus	2	0	133	1	0	0	0	0	2	0	**138**	**93**	112	4	149	152
***Toxoplasma* sp.**	0	0	0	8	2	0	0	0	1	0	**11**	**18**	11	8	24	22
Verotoxigenic *E.coli* (VTEC)	7	0	0	0	1	0	0	0	0	0	**8**	**7**	18			
West Nile virus	0	0	1	0	0	0	0	0	0	18	**19**	**6**	44	36	34	7
Yersinia enterocolitica	2	1	0	0	0	0	0	0	0	0	**2**	**6**	4	2	1	2
Total	**345**	**273**	**191**	**40**	**39**	**52**	**48**	**159**	**22**	**103**	**1,270**	**1,010**	**1,236**	**1,043**	**1,315**	**1,209**

Table 2. *Leptospira* spp. seropositive and IHC positive cases identified at the AHL, 2015

Leptospira* spp. serovar	Bovine	Swine	Equine	Canine	Other & not specified
L. autumnalis	10	1	12	47	0
L. bratislava	12	4	12	17	0
L .canicola	26	2	4	29	0
L. grippotyphosa	7	2	2	38	2
L. hardjo	20	1	4	4	0
L. icterohaemorrhagiae	34	2	8	38	0
L. pomona	29	3	6	10	0
IHC- or urine PCR-positive	0	0	0	0	0

Ontario Animal Health Network

"Your comprehensive source for animal health information."

OAHN Update March 2016

2015 was a very busy and rewarding year for OAHN, with all networks assembled, a successful annual meeting, the launch of our official website, and many reports, infographics, and podcasts published. To learn more about what OAHN was up to in 2015, check out our 2015 in Review Podcast. In addition to this podcast, we have also published a 6-part series on swine influenza, featuring talks with the AHL's Dr. Josepha DeLay, the OVC's Dr. Zvonimir Poljak, as well as veterinarians, researchers, and health professionals from around Canada and the U.S. Listen to it here.

We have now published 34 podcasts, which have been downloaded nearly 11,000 times. We're looking forward to publishing 2 podcasts per month throughout 2016.

On OAHN.ca , we are now allowing registered veterinary technicians, as well as all Canadian and American veterinarians to access our veterinary reports and veterinary resources. 2016 is off to a very productive start, as we have already completed surveys, conference calls and reports for many of our networks. To keep up with what we are doing, please follow us on Facebook and Twitter, and sign up for the OAHN Updates Newsletter.

BEES

The bee network held its latest quarterly conference call on March 9.

SMALL RUMINANTS

The Q4 2015 survey was distributed and completed by 14 veterinarians, with a successful distribution across Ontario. Top items of discussion were: Cache Valley virus, and diarrhea in goat kids. Check the OAHN website for veterinary and producer reports.

BOVINE

The OAHN bovine network had its Q3 quarterly call and released its veterinary report in January. The report outlined recent findings of *Salmonella* Dublin in Ontario, animal health updates, and the importance of Premises Identification. The Q4 bovine survey is available now.

FISH

The OAHN Fish Network had its 5th quarterly conference call in January. Main points of discussion were the upcoming fish project, development of a producer report. It was otherwise quiet for disease outbreaks.

SWINE

The OAHN swine network completed its Q4 2015 veterinary survey and had its quarterly conference call in January. The network's reports are available now.
In addition, the network published a 6-part series on swine influenza, which highlighted perspectives from veterinarians, pathologists, and researchers, and outlined swine influenza in Ontario, Canada, and North America.
Watch for the Q1 2016 swine survey, which will be released at the beginning of April. In case you missed it (ICYMI): Senecavirus A bulletin can be accessed here.

WILDLIFE

CWHC has released its latest quarterly report, combined with an annual report. Check them out here.

ALTERNATIVE SPECIES

The OAHN alternative species network held a conference call in January, with mink veterinarians discussing important issues with experts in the field. Dr. Hugh Hildebrandt presented on *Clostridium* and anaerobes in North American mink.

POULTRY

The OAHN Poultry Network held its Q1 2016 conference call in February. The 2015 reports were used in the 2015-16 Poultry Producer Health updates.
If you have small flock owners in your practice, please click here to learn about subsidized postmortem testing being offered by the AHL.

EQUINE

The equine network held its Q4 conference call in January. The main topics of concern were: Eastern equine encephalitis, box elder toxicity, and equine herpesvirus-1 (EHV-1). The owner and veterinary reports are available on the OAHN website. Watch for the Q1 2016 survey in April.

COMPANION ANIMALS

The OAHN companion animal network had its second quarterly conference at the beginning of February, and released its veterinary report. Disease issues discussed included: tick-borne diseases, leptospirosis spike due to warmer weather this winter, sudden acquired retinal degeneration, and a rabies update.

Want to receive veterinary reports? Email oahn@uoguelph.ca

OAHN expert network projects for 2015-16

As announced at the October 1, 2015, "Staying ahead of the curve" annual Disease Surveillance Plan - Ontario Animal Health Network meeting, we are pleased to be able to provide up to $50,000 per network, for our 10 networks, in support of filling gaps in surveillance. Each network core group, which typically consists of experts from OMAFRA, OVC, the AHL and private practice, was tasked with developing and submitting a project proposal by Dec. 1 to fill a need in their sector.

We're pleased to be able to publicize the approved projects, and we look forward to sharing updates and final reports with our stakeholders. *AHL*

OAHN project	Network	OMAFRA co-lead	PI - signing authority	Title	Budget
OAHN-01	Bovine	Pasma	Godkin	Surveillance for bovine calfhood diseases including *Salmonella* Dublin	50,000
OAHN-02	Poultry	Varga	Guerin	Evaluating virulence genes and antimicrobial susceptibility of avian pathogenic *Escherichia coli* from Ontario broiler and broiler breeder flocks	50,000
OAHN-03a	Swine	Arsenault	Friendship	The creation of a network of sentinel pig farms to enable coordinated preparedness, early detection, and response to animal disease	50,000
OAHN-04a	Small ruminants	Jansen	Menzies	Prevalence and risk factors of *Toxoplasma* infection in Ontario sheep flocks and goat herds	7,500
OAHN-04b	Small ruminants	Jansen	Spinato	Investigation of adult small ruminant mortalities	42,000
OAHN-05b	Equine	Moore	Arroyo	Seroprevalence of *Borrelia burgdorferi* and *Anaplasma phagocytophilum* infection in Ontario horses	38,490
OAHN-06	Fish	Chiasson	Chiasson	Antimicrobial resistance in Ontario aquaculture	25,200
OAHN-07	Bees	Haddad	Slavic	Culture, antimicrobial susceptibility and molecular typing of *Paenibacillus larvae,* a causative agent of American foulbrood (AFB)	50,000
OAHN-08	Wildife zoo	TBD	Jardine	Developing and piloting a web-based reporting system to enhance wildlife disease surveillance in Ontario	48,250
OAHN-09a	Companion animals	Anderson	Peregrine	Investigation of the prevalence of *Echinococcus multilocularis* and risk of infection in wild canids in Ontario, Canada	45,000
OAHN-09b	Companion animals	Anderson	Anderson	Companion animal veterinary infographics	4,800
OAHN-10	Alternative	TBD	Turner mink	Developing a health and disease surveillance network for Ontario mink farms	50,000
				Total	**461,490**

AHL Lab Reports

RUMINANTS

Cache Valley virus – an outbreak of congenital malformations in Ontario lambs

Maria Spinato, Margaret Stalker, Josepha DeLay, Jan Shapiro, Jim Fairles, Paula Menzies, Jocelyn Jansen

During the last week of December 2015 and the first 2 weeks of January 2016, the AHL received several submissions of deformed stillborn and aborted ovine fetuses for postmortem examination. Similar cases were also reported to OVC and OMAFRA small ruminant veterinarians, and included flocks located in eastern, central, and southwestern Ontario. Gross examination of these fetuses revealed **flexural limb deformities, kyphoscoliosis, torticollis, and hypoplastic musculature** (Fig. 1). Most lambs had various degrees of brain malformation ranging from cerebellar hypoplasia (Fig. 2) to hydranencephaly (Fig. 3). In some affected flocks, normal lambs were reportedly born co-twin to deformed littermates.

Histologic lesions included skeletal myofibrillar hypoplasia, disorganized cerebral and cerebellar development with porencephaly. A few cases had mild placentitis typified by occasional small necrotic foci within cotyledonary villi, and rare stromal mineralization or neutrophilic infiltrates. Since similar outbreaks of deformed ovine fetuses caused by Cache Valley virus (CVV) were previously diagnosed in Ontario flocks in 2011-2013, this orthobunyavirus infection was the most likely culprit.

Fetal thoracic cavity fluid and serum samples from affected ewes were forwarded to the Texas Veterinary Medical Diagnostic Laboratory for CVV virus neutralization. As maternal antibody does not cross the ruminant placenta, fetal antibody is considered to be diagnostic for in utero infection. **Positive fetal and maternal antibody titers for CVV ranged from 1:64 to 1:512, confirming CVV as the cause of fetal abnormalities in this outbreak.** Fetal tissues and placenta were also submitted for CVV RT-PCR testing; results for this test were negative. This is not unexpected, as malformations are caused by viral infection at 28-48 days of gestation, and the virus is usually cleared when abortions or stillbirths (full term in sheep is 150 days) occur.

CVV is a mosquito-borne virus. It is transmitted to sheep by infected mosquitos that previously fed on infected white-tail deer, or that are offspring of infected mosquitos. Late summer and early autumn are the months when the highest amount of virus is present in the mosquito population. CVV is considered endemic in most parts of the United States, Mexico, and Canada, and infects a wide range of domestic and wild animals, as well as humans. Since 2010, a new strain of CVV originating in Mexico has emerged and is now the dominant lineage in the Northeastern US. Whether this new variant is responsible for the recent Ontario outbreak, or the unusually warm autumn of 2015 facilitated a protracted period of mosquito transmission, is unknown. Attempts at virus isolation are in progress, but may be unrewarding at this stage.

Similar to Schmallenberg virus in Europe, a related orthobunyavirus that causes lesions identical to CVV, periodic outbreaks of deformed lambs at 3-5 year intervals may just be related to the immune status of the ewe population, which is eventually replaced by naive animals. Infected animals develop life-long immunity. **There are no vaccines or treatments available to protect livestock against CVV.** Shifting the time of breeding or keeping sheep away from cedar bushes and from wet areas during the breeding season may help to reduce exposure to infected mosquitos. *AHL*

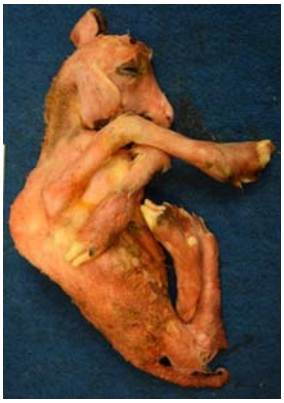

Figure 1: Lamb born with arthrogryposis, kyphoscoliosis and poorly developed musculature.

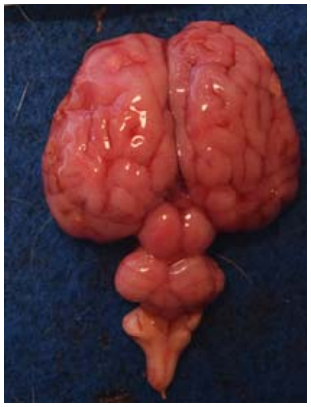

Figure 2: Cerebellar hypoplasia.

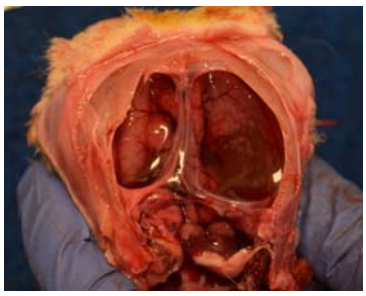

Figure 3: Hydranencephaly.

SWINE

Senecavirus A testing update

Jim Fairles, Josepha DeLay, Davor Ojkic

Senecavirus A (Seneca Valley virus A, SVV) has become a concern for the Ontario swine market as our neighbours in the US continue to diagnose cases.
https://www.aasv.org/aasv%20website/Resources/Diseases/SenecaValleyVirus.php

The Ontario Animal Health Network (Swine) has links to bulletins outlining the disease.
http://oahn.ca/resources/networks/swine/

Testing for SVV is dependent on the clinical syndrome:
⇒For cases with **vesicular lesions**, CFIA must be contacted in order to exclude *Foot-and-mouth disease virus* infection.
⇒In herds experiencing a **sudden increase in neonatal mortality** but with no apparent vesicular lesions, samples can be submitted to the Animal Health Laboratory (AHL).

The PCR test for SVV has been recently validated by the CFIA and the protocol distributed to the Canadian Animal Health Surveillance Network labs, of which the AHL is a member.

Test cost is $31 (Ontario clients) and the short code is "**svvpcr**".

Typing of influenza viruses in 2014 and 2015

Davor Ojkic

Hemagglutinin and neuraminidase genes were identified for **86 influenza viruses** detected in swine samples submitted to the AHL in 2014 and 2015. There was a noticeable increase in both the number of submissions and the number of influenza A positives: 18 influenza A viruses from 2014 and 68 viruses from 2015 were subtyped (Table 1).

In **2014**, almost three-quarters (72%) of typed viruses were H3N2 subtype; 28% were H1N1 subtype. All 13 H3N2 viruses were cluster 4-related (94-97% amino acid sequence identity). Four of 5 subtyped H1N1 viruses were related to the "pandemic 2009" H1N1 cluster; one was related to the contemporary "swine" influenza virus alpha cluster.

In **2015**, the situation had changed, and 50% of typed influenza viruses were H1N1 subtype, while the proportion of H3N2 viruses had decreased to 37%. Again the majority (29) of H1N1 viruses were related to the "pandemic 2009" H1N1 cluster, whereas 9 samples had beta-cluster viruses, and 3 contained alpha-cluster viruses. H3N2 viruses in 2015 were 94-97% identical to cluster 4 viruses.

In **2014**, H1N2 viruses were not detected, but H1N2 represented 6% of viruses typed in 2015. The frequency of detection of mixed infection (2 influenza viruses detected in the sample) has also increased from 0% in 2014 to 7% in 2015.
AHL

Table 1. Influenza A viruses of swine origin typed at the AHL in 2014 and 2015.

Year	H1N1	H1N2	H3N2	Mixed H1N1/H3N2	Total
2014	5	0	13	0	**18**
2015	34	4	25	5	**68**
Totals	**39**	**4**	**38**	**5**	**86**

AVIAN/FUR/EXOTIC SPECIES

Pediculosis (*Stachiella larseni*) in farmed mink

Marina Brash, Emily Martin, James D Heal, Hugh Hildebrandt

In early January 2015, a mink producer submitted 2 dead unpelted Sapphire mink with rough hair coats, alopecic skin abrasions (Fig. 1), and chewed tail tips (Fig. 2) to the Animal Health Laboratory for identification of the ectoparasites found on the fur. This same producer had submitted mink less than 2 years previously with the same complaint.

The ectoparasites were identified based on the following taxonomic features:

1) Lice: Order *Phthiraptera*

2) Biting lice: Head wider than thorax.

3) Suborder *Ischnocera*: Mouthparts without palps.

4) Genus ***Stachiella***: Host species (mink), 3 segmented antennae without a club, and characteristic body lengths (females 1.1 mm, males 0.8 mm) (Fig. 3).

5) Species: ***S. larseni***. The defining structures included abdominal tergal plates without narrow heavily sclerotized bands and 2 pairs of distinctive anterior dorsal abdominal spine-like setae and sparse fine setae on the rest of the abdomen (Fig. 4). These 2 features distinguished *S. larseni* from *S. ermineae* (primarily found on weasels) and *S. retusus* (primarily found on weasels and martens) that are also less frequently identified on mink.

There is very little information in the literature describing lice from mink, but it is recognized that lice are typically very host-specific and are often found on only one host species, or closely related species. Therefore, **these lice are not considered to have originated from dogs**. If lice are present on farmed animals, populations may be at low, undetectable levels for most of the year but then usually peak in the winter when animals are kept indoors and close together. The winter of 2014/2015 in Ontario was exceptionally cold for prolonged periods of time. Although the mink were housed in pens inside sheds, this extended cold could have provided sufficient additional stress, especially for colour mutation mink, during a time when the mink were also preparing for the upcoming breeding season.

The quality of the mink pelt is an important factor dictating the value of the pelt, so keeping the ectoparasite burden under control is imperative. Since this farm experienced clinical pediculosis in the recent past, since lice populations can fluctuate widely, and since the farm has been consistently populated with mink for years; **it is likely a low level louse population has been present on this farm for a few years**.

When considering treatment and control, the life cycle of the parasite needs to be considered given the very short cycle with eggs hatching in ~1 week. The eggs are not affected by insecticides and, since the lice are mostly associated with the animal and less often in the environment, treatment of the animal must be done on a weekly basis. Treatment with permethrin, pyrethrin, or malathion powders in the nest box on a multi-weekly basis should be adequate and if nest box bedding is replaced, it will need to be retreated.

Ectoparasites are not often identified on mink farms but monitoring should still be part of herd management. Considering that quality pelts are the primary product of mink production, external examination during handling times will help identify underlying populations before they impact the health, wellbeing and pelt quality of the mink. *AHL*

Figure 1. Large numbers of pinpoint tan lice are on the tips of the fur. There are alopecic skin abrasions and whirls of damp, disheveled fur over the lateral and ventral abdomen.

Figure 2. Chewed tail tip. A few lice are present on the fur.

Figure 3. *Stachiella larseni* male louse, 0.8 mm long.

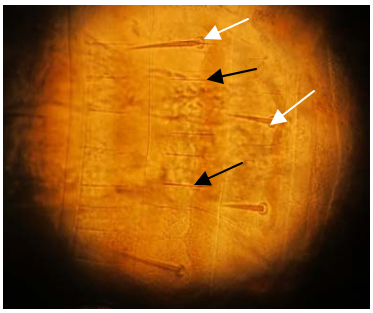

Figure 4: *Stachiella larseni* male louse. Note the 2 pairs of distinctive anterior dorsal abdominal spine-like setae (white arrows) and sparse fine setae (black arrows) on the rest of the abdomen. Head of the mite is to the right.

Evaluating virulence genes and antimicrobial susceptibility of avian pathogenic *Escherichia coli* from Ontario broiler and broiler breeder flocks

Michele Guerin, Csaba Varga, Durda Slavic, Patrick Boerlin, Marina Brash, Emily Martin, Rachel Ouckama, Alexandru Weisz, Mike Petrik, Cynthia Philippe, Melanie Barham

Avian pathogenic *Escherichia coli* (**APEC**), a subgroup of extra-intestinal pathogenic *E. coli*, cause diseases collectively named '**colibacillosis**' in poultry. In broiler chickens, the most common lesions observed on gross postmortem include airsacculitis, pericarditis, perihepatitis, and cellulitis. Colibacillosis causes high morbidity and mortality in broiler chicken flocks, causing extensive economic losses.

The Ontario Animal Health Network (Poultry) reports early systemic bacterial infection in chickens <14 days of age to be very common in Ontario; *E. coli* is the predominant bacterium isolated, with flock mortality ranging from 1.0 to 15%. Similarly, in broiler chickens >14 days of age, late systemic *E. coli* infection is the most common diagnosis, with seasonal variation in the number of cases. Cellulitis accounts for a large proportion of chicken condemnations at broiler processing plants in Canada. The objectives of this project are to: 1) identify the most common virulence genes of APEC strains in Ontario broiler and broiler breeder flocks; 2) determine antimicrobial resistance patterns of APEC strains in Ontario broiler and broiler breeder flocks using the disk diffusion susceptibility testing method; and 3) evaluate potential relationships between virulence genes and antimicrobial resistance.

This study will provide baseline data on the virulence genes and antimicrobial susceptibility of APEC strains isolated from clinical cases of colibacillosis in Ontario, which will help to preserve the efficacy of antimicrobials in treating this disease, and which will provide critical information for alternative treatment or prevention, including creating a candidate vaccine to reduce or eliminate infections.

This project (OAHN-02) is funded by the OMAFRA-University of Guelph Strategic Partnership, under the Disease Surveillance Plan, which is a joint federal-provincial Growing Forward 2 project. *AHL*

HORSES

Ontario Racing Commission Death Registry: 2015 postmortem summary

The Ontario Racing Commission (ORC) has a long established record and takes pride in its proactive approach to advance the welfare of the racehorse and safety of the participant. In 2003, Ontario became one of the first North American racing jurisdictions to require mandatory reporting of racehorse deaths, in order to monitor, research and improve our knowledge of why these tragic events occur. The ORC Death Registry continues to provide excellent data regarding the causes of morbidity and mortality in racehorses in this province.

Summaries of postmortem submissions to the Animal Health Laboratory under this program and diagnoses by body system for these cases are provided in the following tables. *AHL*

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Table 1. Breed distribution of ORC Death Registry submissions to the AHL, 2003-2015

Breed / Year	Standardbred	Thoroughbred	Quarter Horse	Total
2003	67 (54%)	58 (46%)	0	**125**
2004	82 (58%)	60 (42%)	0	**142**
2005	59 (54%)	51 (46%)	0	**110**
2006	58 (54%)	47 (44%)	2 (2%)	**107**
2007	66 (54%)	53 (43%)	3 (3%)	**122**
2008	27 (53%)	24 (47%)	0	**51**
2009	28 (62%)	16 (36%)	1 (2%)	**45**
2010	22 (69%)	8 (25%)	2 (6%)	**32**
2011	24 (52%)	18 (39%)	4 (9%)	**46**
2012	20 (59%)	14 (41%)	0	**34**
2013	19 (40%)	27 (56%)	2 (4%)	**48**
2014	21 (41%)	23 (45%)	7 (14%)	**51**
2015	29 (53%)	23 (42%)	3 (5%)	**55**

Continued - ORC Death Registry

Table 2. Postmortem diagnoses of ORC Death Registry submissions by body system, 2003-2015.

Diagnosis by body system:	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Fracture / limbs	53 (42%)	69 (49%)	48 (44%)	42 (39%)	54 (44%)	16 (31%)	4 (9%)	9 (28%)	6 (13%)	2 (6%)	23 (48%)	23 (45%)	**22 (40%)**
Fracture / other	10	4	7	13	10	5	0	3	6	2	2	7	**6**
Non-fracture musculoskeletal	8	6	6	8	6	5	2	3	1	0	3	4	**4**
Gastrointestinal	15	19	17	16	18	5	4	7	5	6	4	6	**5**
Respiratory (including EIPH)	21	17	9	11	16	9	21	6	9	7	4	5	**5**
Cardiovascular	5	6	5	5	2	4	6	2	4	1	7	3	**0**
CNS	6	11	7	4	1	1	2	0	5	4	3	0	**2**
Integumentary	0	0	1	2	2	1	1	0	0	0	0	0	**0**
Renal	0	2	0	0	2	0	1	0	0	0	0	0	**0**
Hematopoeitic	2	1	1	0	0	0	0	0	0	0	0	0	**0**
Other conditions (e.g., septicemia, suspected anaphylaxis)	1	7	5	2	9	0	4	0	6	6	2	1	**8**
Cause of death undetermined	4 (3.2%)	0 (0%)	4 (3.6%)	4 (3.7%)	2 (1.6%)	5 (9.8%)	0 (0%)	2 (6%)	4 (9%)	6 (18%)	0 (0%)	2 (4%)	**3 (5%)**
Total	**125**	**142**	**110**	**107**	**122**	**51**	**45**	**32**	**46**	**34**	**48**	**51**	**55**

Table 3. Musculoskeletal injuries in ORC Death Registry submissions by breed and anatomic site, 2015.

Lesion	TB	SB	QH	Total
P1 fracture - RF		1		1
P1 fracture - LH		4		4
P1 fracture - RH	1	2		3
Carpal fracture - L	1			1
Proximal sesamoid fracture –RF	1	1		2
Proximal sesamoid fracture - LF	2			2
Proximal sesamoid fracture - LH	1			1
Metacarpal III fracture - R	1	2		3
Metacarpal III fracture - L	2			2
Metatarsal III fracture - R	1			1
Metatarsal III fracture - L	2			2
Scapula fracture			1	1
Pelvis fracture	2			2
Vertebral fracture	1			1
Skull fracture			1	1
Sacroiliac subluxation			1	1
Flexor tendon laceration – RF		1		1
DJD, pastern and coffin joints, LF		1		1
Septic synovitis		1		1
Acute myopathy (tying up)		1		1
Total by breed	**15**	**14**	**3**	**32**

Table 4. Non-musculoskeletal diagnoses in ORC Death Registry submissions, 2015.

Gastrointestinal:
- Gastric impaction (1)
- Salmonellosis (1)
- Distal colon obstruction by phytobezoar (1)
- Typhlocolitis, etiology undetermined (1)
- Perforated cecum and peritonitis (1)

Respiratory:
- Exercise-induced pulmonary hemorrhage (EIPH) (2)
- Acute fibrinous pleuropeumonia – *S. equi* ssp. *zooepidemicus* (1)
- Pleuritis - *S. equi* ssp. *zooepidemicus* (1)
- Peracute bacterial pneumonitis / sepsis (1)

CNS:
- Severe acute encephalitis, cause undetermined (1)
- Equine protozoal myelitis (1)

Other / whole body conditions:
- Injection-associated death, suspect anaphylaxis (3)
- Systemic hemorrhage, cause undetermined (2)
- Septicemia (1)
- Multisystemic trauma (race / stall accident) (2)

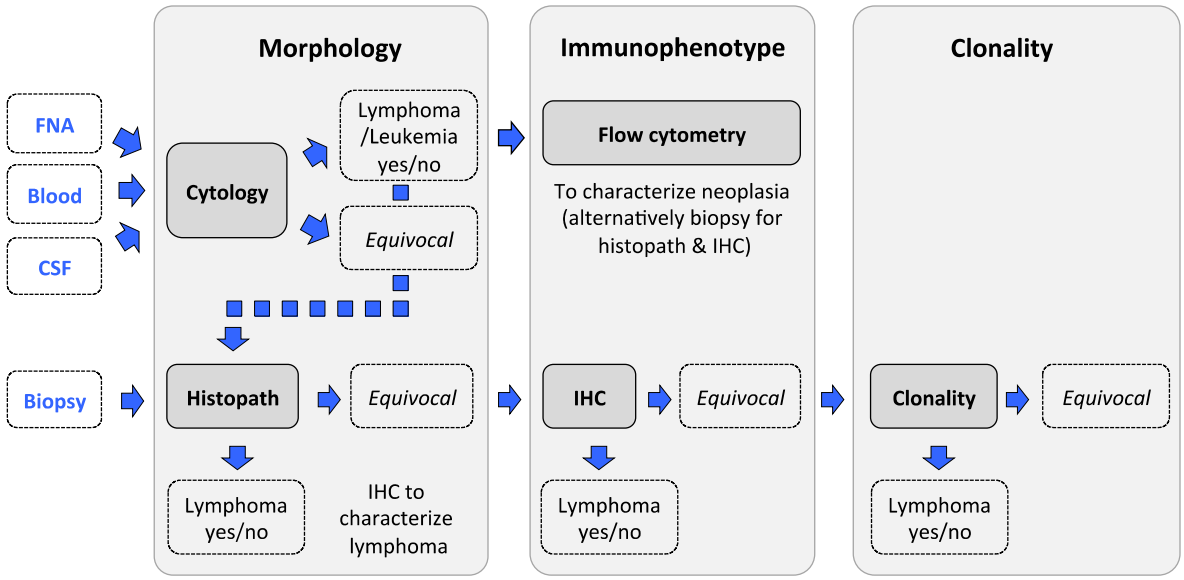
COMPANION ANIMALS

Clonality testing/PARR update

Stefan Keller

Clonality testing or PCR for antigen receptor rearrangement (**PARR**) is a molecular test that can **help diagnose lymphoid neoplasia when light microscopy-based methods are equivocal** (see testing algorithm below). The test is now available in concert with the Keller lab (Department of Pathobiology), which will allow for faster turnaround and more direct communication between clients, AHL pathologists, and the clonality lab.

Species: Cats and dogs.
Specimens: Stained/unstained cytology slides, FFPE tissues, fluids.
Testing schedule: Once a week, cut-off is Monday at noon.
Turnaround time: Thursday noon, if samples were submitted before Monday noon.
Immunophenotyping: Clonality testing is an interpretive test and requires prior immunophenotyping (IHC, ICC, flow cytometry).
Pricing: Depending on the sample type (histopathology, cytopathology, fluids) between $212-$230.
For more information regarding sample submission and proposed testing strategy of suspected lymphoid proliferations, please see AHL LabNote 44 - Testing algorithm for suspected lymphoid neoplasms
http://www.guelphlabservices.com/files/AHL/AHL%20LabNotes/Labnote%2044%20Testing%20algorithm%20for%20suspect.pdf



Clonality testing can help distinguish reactive from neoplastic lymphoid proliferations if other methods are equivocal. Clonality results must be interpreted in conjunction with clinical, morphologic, and immunophenotypic data, and should hence be done as the last step in the diagnostic algorithm. Clonality testing is not suitable for immunophenotyping. Clonality testing from cytology samples is feasible if a biopsy cannot be obtained readily (e.g., CSF, effusions without primary mass, etc.). Ideally, additional material should be obtained for immunophenotyping (flow cytometry, immunochemistry). The latter information is required for the interpretation of clonality results. Samples without immunophenotyping will not be accepted. *AHL*

Fatal babesiosis in a dog imported into Canada

Andrew R. Vince

The body of a 10-week-old mixed-breed puppy was received at the Animal Health Laboratory for postmortem examination after dying unexpectedly during importation to Canada from the Dominican Republic. Grossly, there was mild generalized icterus of mucous membranes and soft tissues. The spleen was enlarged and fleshy (rather than congested) on cut section. The liver was generally pale, both renal cortices were dark red-grey, and the urinary bladder contained moderate quantities of red-tinged urine. A tentative gross diagnosis of hemolytic anemia was made. Histologically, there was diffuse interstitial pneumonia with capillary thrombi, and most intravascular erythrocytes contained small (1-2 µm) round-to-pyriform, faintly-basophilic Giemsa -positive, PAS-negative organisms suspicious for *Babesia* spp. (Fig. 1). There were lesions of acute hypoxic injury in the liver and kidney, and some renal tubular epithelium contained hemoglobin-like pigment globules. Fresh-frozen lung was submitted to the Vector-Borne Disease Lab at North Carolina State University for PCR panel assessment for *Babesia, Anaplasma, Bartonella, Ehrlichia, Rickettsia,* and hemotropic *Mycoplasma* spp. **DNA consistent with *Babesia canis vogeli* was identified within lung, and a final diagnosis of acute *Babesia*-associated hemolysis was made.**

Babesia spp. are hemoprotozoan parasites transmitted by ticks within the US and South America, particularly the tick *Rhipicephalus sanguineus*. Internationally, these are of great economic concern, particularly their impact on animal health and productivity. Dogs have been reportedly infected with *B. vogeli, B. conradae, B. gibsoni, B. vitali, B. rossi, B. canis,* and an unspeciated *Babesia* species. In dogs, clinical babesiosis varies from mild to severe forms, manifesting as hemolysis and secondary systemic hypoxic and inflammatory organ injury, organ dysfunction, shock, and death. The prognosis of clinically ill dogs infected with *Babesia canis* may be negatively predicted by hyperlactatemia, leukopenia, hyperphosphatemia, hypertriglyceridemia, and hypoproteinemia, hypoglycemia, increased serum cortisol, and clinically compromised circulation/consumptive coagulopathy.

Trends indicate that importation of domestic dogs to Canada from overseas is becoming more common, although this is not well-tracked and reliable statistics are not available. This pattern of importation provides a greater risk of infectious diseases being imported along with them, and because many of these pathogens depend on environments or vectors not seen in Canada, recognition is often delayed. Moreover, **because of the presence of competent tick vectors in regions of Canada, the importation of dogs with babesiosis may provide a risk to other dogs.** Hemotropic parasites such as *Babesia, Anaplasma, Mycoplasma, Bartonella, Ehrlichia,* and *Rickettsia* spp. should be considered as differential diagnoses in imported dogs, and blood testing (including review of blood smears) prior to importation of dogs from endemic areas is recommended to avoid undue loss of life and to reduce the risk of establishing infection within Canadian tick populations. *AHL*

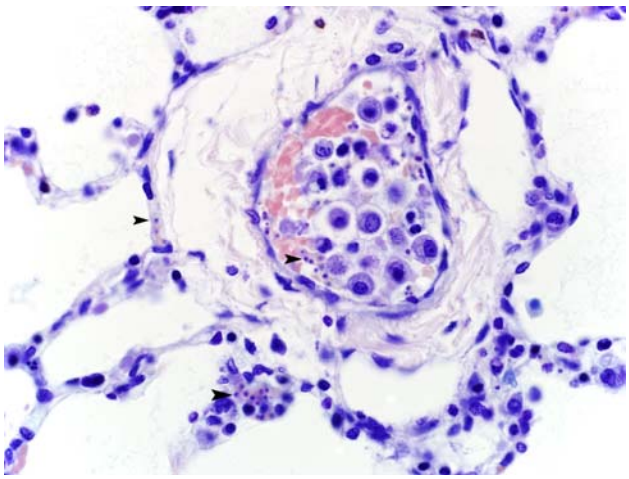


Figure 1. Lung, 600x magnification, Giemsa stain. Hypochromatic erythrocytes in blood vessels contain Giemsa-positive, roughly round, 1-2 µm diameter *Babesia* organisms, often in pairs (arrowheads).

An update on PCR testing for dogs *Davor Ojkic*

The AHL has been increasing the number of real-time PCR tests designed for detection of viruses affecting dogs. In addition to single-target tests for detection of ***Canine parvovirus 2*** and ***Canine distemper virus***, we have developed and validated a **triplex real-time PCR test for detection of *Canid herpesvirus 1, Canine adenovirus 2,* and *Canine parainfluenza virus*.**

Although influenza A viruses have not been detected in dogs in Canada, the risk of influenza cannot be underestimated – for rapid detection of influenza A viruses we also offer an **influenza A virus PCR**. All tests are run daily and typical turnaround time is the next business day. *AHL*