Laboratory Services Division
Animal Health Laboratory

AHL Newsletter

AHL Newsletter, Volume 24, Number 4 **December 2020**

In this issue:

AHL Newsletter
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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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To receive an **electronic copy of this Newsletter**, please send your email address to: holiver@uoguelph.ca

Specimen reception update

Jim Fairles

Animal Health Laboratory, University of Guelph, Guelph, ON

Courier Shipping through December

As many of you are aware, shipping during the COVID-19 pandemic has been trying at times. We have been made aware of a backlog in sorting at the local Purolator depot (this affect ALL couriers and is not specific to Purolator). Packages may/will be delayed!! With the Black Friday weekend, Christmas, and overall increase in online shopping, we have some recommendations to keep in mind when shipping your specimens to AHL-Guelph.

- Package your specimens with the expectation that the shipment will take 2 days (use extra freezer packs, absorbent materials, sturdy container/box).
- Ship your specimens to AHL-Guelph Monday - Wednesday when possible.
- Take note/make a copy of your waybill tracking number each time that you submit and track your package.
- Purolator is no longer guaranteeing Saturday delivery. AHL will not be providing Saturday waybills unless under special circumstances. If sending a sample on Friday, expect Monday delivery at the lab. Alternately, if you cannot drive the sample in to the lab on Friday, hold it for Monday shipment to avoid the specimen sitting in a warehouse for the weekend. We are not responsible if your package does not arrive until Monday.
- The AHL specimen reception is available for sample drop-off between 7AM to 10PM daily.
- During this time, Post mortem submissions should not be sent via courier. Please call us for updates around handling of PM submissions and drop off. AHL Kemptville PM drop off continues 24/7 as usual.
- AHL does have some local courier options – please call us to discuss (fees may apply).
- Please also take note of our cold weather shipping reminder. Courier warehouses are not temperature controlled and as we enter winter, samples may freeze.

Cold weather shipping reminder

At this time of year, we need to start thinking about preventing samples from freezing. Specimens such as EDTA blood are rendered useless when frozen. Formalin will also freeze, which creates artifacts in fixed tissue.

It can be difficult to protect samples that are shipped during the winter from severe cold. To inhibit or reduce formalin freezing, add 1 mL of ethanol per 10 mL of formalin. Samples that should not be frozen can be shipped inside insulated containers with minimal cold packs. Use of room temperature cold packs will help prevent temperatures from dipping too low. If you have any concerns about the best way to ship critical samples, please contact the AHL. ahlinfo@uoguelph.ca

AHL holiday hours 2020/2021

Except for Wed. Dec. 25 (closed – no service), AHL-Guelph is open every day from Wed. Dec. 23 until Sun Jan 3, 2021 with limited services. The University of Guelph is officially closed during this period.

Wed. Dec. 23	All laboratory sections open with limited services
Thurs. Dec 24	All laboratory sections open with limited services
Fri. Dec. 25	Guelph and Kemptville laboratories closed
Sat. Dec 26	Guelph: specimen receiving, emergency mammalian postmortems; Kemptville closed
Sun. Dec. 27	Guelph: specimen receiving, emergency mammalian postmortems; Kemptville closed
Mon. Dec. 28	Guelph: specimen receiving, emergency mammalian postmortems; Kemptville closed
Tues. Dec. 29	All laboratory sections open with limited services
Wed. Dec. 30	All laboratory sections open with limited services
Thurs. Dec. 31	All laboratory sections open with limited services
Fri. Jan. 1	Guelph: specimen receiving, emergency mammalian postmortem; Kemptville closed
Sat. Jan. 2	Guelph: specimen reception, emergency mammalian postmortems, full bacteriology set-up, as well as clinical pathology testing; Kemptville closed
Sun. Jan. 3	Guelph: specimen receiving, emergency mammalian postmortems only; Kemptville closed
Mon. Jan. 4	All laboratory sections open with full service

Guelph **drop box and fridges available 7AM to 10PM** and Kemptville **drop box and/or fridges are available 365/24/7** for specimen drop off.

For full details, please see our website – www.ahl.uoguelph.ca

Season's Greetings from the staff of the

Animal Health Laboratory

Update from the Director

The view from the Director's office

The University of Guelph campus is quite beautiful after the first major snowfall of the season, but eerily quiet due to the absence of students under COVID restrictions. As cases continue to increase during this second wave, it is proving to be a challenge to maintain staffing levels, as is likely the situation in your organizations as well. Any contact with a suspect or positive COVID case necessitates a 14-day period of self-isolation, and due to increasing community spread, the number of potentially exposed staff also continues to grow. We thank you for your patience if you experience delays in testing associated with reduced staff levels in a particular laboratory section.

In addition to all the great case reports and lab updates that comprise every AHL newsletter, we have started a new column entitled "Staff highlights". So many of our staff are involved in interesting and important initiatives that are allied with laboratory management or that support national and international veterinary organizations. For this inaugural column, we are featuring Dr. Melanie Barham, the Co-ordinator of the Ontario Animal Health Network. To fulfill the research requirements of her MBA program, Dr. Barham decided to investigate veterinary career paths and the reasons for remaining in or leaving the profession. The results will be of interest to practice owners concerned about retention of veterinarians in their organization, and to veterinarians contemplating a career shift.

From all of us at AHL to you and your families, we send our very best wishes for continued health and safety, and some measure of respite and happiness during the holiday season.

Maria Spinato, Director

Animal Health Laboratory, University of Guelph, Guelph, ON.

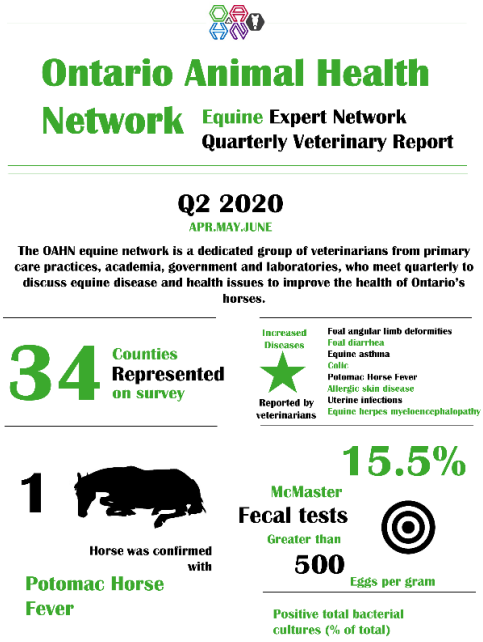
OAHN Update – December 2020

Mike Deane and Melanie Barham

Animal Health Laboratory, University of Guelph, Guelph, ON

AHL Newsletter 2020;24(4):5.

The Ontario Animal Health Network has been busy throughout the fall, releasing many new reports and updating our resources. Read on to find links and descriptions of what we have been working on.



New Reports

We have published new reports for the equine, companion animal, poultry, swine, and bovine networks. All of the veterinary reports feature summaries of quarterly lab data and survey results, as well as focusing on other animal disease and health issues.

The equine network created an infographic that summarizes all the laboratory and survey data that was gathered and discussed on the network's quarterly call. The veterinary report also provides information about insect bite hypersensitivity.

The companion animal network's veterinary report features a focus on leptospirosis – providing tips for managing lepto patients – as well as pet pigs.

The swine network report has information about the CanSpot ASF surveillance tool which has been launched as a pilot project, and information about PED in Ontario, as there were seven new sites of PED in Q2.

The bovine network's vet report features a case report on sorghum feed-associated nitrate toxicosis in a group of Holstein heifers, as well as an emerging pathogens report on bovine kobuvirus.

The poultry network focused on viral hepatitis in turkey, as well as breaking down the lab data and survey results. You can view all of the reports by going to OAHN.ca, choosing the network, and scrolling down to the reports (veterinarians must be registered to view veterinary reports).

Updated Covid-19 Resources

We continue to update our covid-19 and mental health resources for veterinarians. We currently have a comprehensive list of resources related to all new developments involving covid and animals, as well as species-specific resources.

OAHN canine import study: Dogs needed!

Despite COVID-19 travel restrictions, significant numbers of dogs continue to be imported into Canada in 2020. We continue to seek importers and dogs to participate in our study looking at pathogen shedding in recently imported dogs from Asia.
*Any such dog examined by a veterinarian within 48 hours of arrival in Ontario is eligible to participate and receive **free** testing for a number of canine pathogens and antimicrobial-resistant bacteria.* Up to 10 dogs from a single shipment can be included. Please contact the project lead, **Dr. Scott Weese**, for more information. Also check out the **new OAHN canine importation and rescue resource page**!

OAHN Website: Take a look at the newly updated OAHN website at **OAHN.ca**! Featuring a more intuitive navigation and improved organization of OAHN network materials.

Staff highlights – Veterinary career paths: what do we know?

Melanie Barham

Animal Health Laboratory, University of Guelph, Guelph, ON

AHL Newsletter 2020;24(4):6.

The topic of veterinary careers might seem an unlikely topic for an Animal Health Lab Newsletter article. I was asked to share some of the key findings from a research project conducted as part of my MBA program at the University of Guelph. A survey of 1044 veterinarians globally was conducted in January 2020 (before COVID-19 hit North America), asking veterinarians what positions they held, about their career shifts, and how they felt about their career moves. More than half (59.2%) of the respondents were currently in primary care clinical practice, while 16.85% had moved out of primary care but had remained within the profession (such as the pathologists at AHL), and 23.50% had left the profession entirely. Here are a few key findings from this research project:

1. **Who considers leaving?**
   Of the veterinarians who were currently in primary care practice, 72.64% had considered leaving practice. This large number is important because we know from general careers research that the thought of leaving a profession is the first along 2-3 steps to making a major career shift. The top cited reasons for considering a career shift are (in descending order): burnout, long hours, compassion fatigue, on-call requirements, and family responsibilities. There was no significant difference between male and female veterinarians.

2. **What made them stay?**
   Of those who never considered leaving primary care practice, the majority (>60%) mentioned making tweaks to their careers (mini-shifts) such as moving to management/ownership, finding a new focus or new clinical skills in practice. Continuous learning was considered important for all veterinarians.

3. **For those on the fence, what helped?**
   For those who decided to stay in primary care practice, despite at some time considering leaving, they cited changing jobs within the same type of veterinary medicine, changing mindset about practice, development of boundaries, and negotiating different terms of employment as top changes that allowed them to stay in practice. Practice owners may wish to take note that encouraging flexibility in the workplace and investing in healthy resilience skills for staff may be excellent investments for long-term retention.

4. **What about those who did move out of primary care practice?**
   For those veterinarians who did make career shifts, the top reasons cited were (in descending order): curiosity about another path, readiness for a new challenge, long hours, and burnout.

5. **Non-linear careers**
   Veterinary careers were far from linear, and many people shared that they had left and returned to practice many times, or changed areas of practice. Almost half (40.2%) of respondents indicated that they had made career shifts within primary care practice (e.g., bovine practice to companion animal practice).

6. **Support is incredibly important**
   All veterinarians cited support of family, friends, and mentors as major contributors to their career decisions, staying in practice long term, making career shifts, and professional satisfaction. For example, over 54% of veterinarians who decided to stay in clinical practice despite considering leaving cited the support of family and friends as the key factor to their decision. This finding

highlights the ongoing need for maintaining connections and relationships, both with colleagues and mentors as well as family and friends as we make decisions about our careers.

What can we take away from this, especially in a pandemic?
As employers or employees, it also seems to be more and more evident that building a career that is continually interesting, challenging, and fulfills our sense of vocation to help animals is crucial to our success as professionals. Equally important is the need for ensuring strong non-clinical habits such as boundaries, maintaining all aspects of health, and allowing time to connect with our peers, colleagues and families. *AHL*

RUMINANTS

Abortion and calf septicemia associated with *Salmonella* Dublin infection in a Holstein herd

Margaret Stalker, Jamie Hobson, Cynthia Miltenburg, Andrew Brooks

Animal Health Laboratory, University of Guelph, Guelph, ON (Stalker, Brooks); Eldale Veterinary Clinic, Elmira, ON (Hobson); OMAFRA, Guelph, ON (Miltenburg)

AHL Newsletter 2020;24(4):7.

A near-term aborted Holstein fetus was presented to the AHL for postmortem examination. The herd had a history of two previous late term abortions in the last 2 months, and was also reporting losses of newborn to 2-week-old calves with apparent respiratory signs. The fetus was normally formed and autolysed. On histology, there were poorly preserved inflammatory cells within the lung. Bacterial culture of the lung grew 4+ Group D *Salmonella* spp., later serotyped as *Salmonella* Dublin. PCR tests for other infectious causes of abortion, including bovine herpesvirus 1, BVD, *Neospora caninum* and *Leptospira* spp. were negative.

Ten days later, a 5-week old calf that died following a clinical history of pneumonia was submitted for a follow-up postmortem. Gross lesions included an enlarged and meaty spleen and generalized pulmonary congestion. On histology, this calf had lesions of a fulminant bacterial septicemia, typified by multifocal areas of inflammation and necrosis with visible bacterial colonies in the spleen, kidney, liver and lung, as well as an enterocolitis. Primary bacterial cultures of lung and spleen again grew 4+ *Salmonella* Dublin, while *Salmonella* was isolated only on enrichment culture from the intestine.

Salmonella Dublin was first detected in Ontario in 2012, and continues to be an important emerging pathogen for the Ontario dairy industry. *S.* Dublin is a host-adapted strain for cattle, and transmission is typically via the fecal-oral route (1). The presence of infected but non-clinical carrier animals in the herd provides a source of environmental exposure, with intermittent shedding in manure, milk, saliva, and urine resulting in infection of susceptible animals. Colonization of the gastrointestinal tract is followed by bacteremia and spread to multiple organs including lung, liver, spleen and kidneys. Unlike most *Salmonella* infections which present clinically as diarrhea, common presenting signs of *S.* Dublin infection in calves are septicemia and pneumonia, often accompanied by fever, anorexia, and depression. Affected calves are usually 2-12 weeks of age; however, clinical disease can occur in calves up to 6 months old. Bloody diarrhea, arthritis or meningitis may also occur. While the initial infection is difficult to treat because most isolates are resistant to many antimicrobials, calves that survive the infection may become carriers for life. Identifying these carrier animals is very challenging, and

improving biosecurity, sanitation, colostrum quality, and calf, heifer and mature cow management remain the mainstays of reducing the risk of disease transmission and limiting the cost of outbreaks.

As illustrated in this case, *S.* Dublin can become bacteremic, cross the placenta and cause abortion. This is the predominant clinical sign in some herds, particularly in Europe, where abortion may be the first indication of infection in a herd. **However, this is the first case of abortion due to *S.* Dublin documented at the AHL in Ontario.** *AHL*

Reference

1. Henderson K, Mason C. Diagnosis and control of *Salmonella* Dublin in dairy herds. In Practice 2017;39:158-168.

Severe myopathy in lambs

Felipe Reggeti, Andrew Brooks, Nick Schrier, James Dykeman, Tracy Van Raaij

Animal Health Laboratory, University of Guelph, Guelph, ON (Reggeti, Brooks, Schrier, Van Raaij); Miller Vet Services(Dykeman)

AHL Newsletter 2020;24(4):8.

Twenty 2 to 3-week-old lambs from a herd of 120 ewes died after showing clinical signs consistent with lethargy and diarrhea. The lambs were offered a new "starter" ration, as well as medicated pellets as a free choice creep feed (lasalocid sodium 36 mg/kg), and an undetermined amount of a mineral mix, also fed to the adults. The owner reported that the losses coincided with offering the starter, and that the animals did not seem to like it very much. Clinical signs improved after treatment with Amprol, Baycox and Biomycin, but approximately half of the affected animals developed posterior paresis.

Three live lambs were submitted to the AHL for diagnostic evaluation. Blood samples were drawn before euthanasia and forwarded to the Clinical Pathology laboratory. Complete blood counts (CBC) identified neutrophilia and thrombocytosis in all samples, consistent with inflammatory disease, which was further supported by elevated haptoglobin concentrations (acute phase response). Serum creatine kinase (CK) and aspartate aminotransferase (AST) were significantly elevated in 2 animals, with the highest concentrations being CK: 310,400 U/L (reference interval 23-313 U/L) and AST: 19,751 U/L (reference interval 23-313 U/L). These findings indicated cellular damage with leakage of intracellular muscle enzymes into plasma.

On postmortem examination, there was gross evidence of diffuse myopathy (**Fig. 1**). On histopathology, the 2 animals with the highest CK and AST concentrations had very severe extensive skeletal muscle necrosis and mineralization. A few granular casts were noted in the renal medulla, possibly due to myoglobinuric nephrosis.

Based on laboratory results and postmortem findings, the main differential diagnoses were nutritional myopathy and toxic myopathy; appropriate samples were submitted to the AHL Toxicology laboratory for further testing. Liver selenium levels were adequate, but serum vitamin E concentrations were sub-optimal. The starter feed and the mineral mix were tested for ionophores; namely, monensin, narasin and salinomycin. Results were below the detection limits of the method for the starter feed, but monensin was present in the mineral mix at 58 ppm which was not supposed to be medicated, according to the product's label. Monensin was also identified in the ruminal contents of one of the lambs at 5.8 ppm.

Markedly elevated serum CK and AST concentrations and extensive muscle necrosis appeared to be too severe for nutritional myopathy alone. CK levels in acute nutritional muscular dystrophy in lambs have been reported to be higher than 1000 IU/L and commonly between 5000-10,000 IU/L, although they may

be higher in some cases. AST commonly increases to 2000-3000 IU/L (1). These observations, along with inadvertent exposure to monensin, raised concerns for ionophore toxicity; however, toxicity could not be confirmed because the amount of the ionophore consumed could not be determined. Since the recommended dose of monensin in feed for sheep is 11 mg/kg to 22 mg/kg (0.0011% to 0.0022%) (2), identification of 5.8 ppm monensin in the rumen seemed to be a safe level. However, these results only confirmed exposure, as any residues present in the rumen would depend on the amount of feed ingested, homogeneity of the ration, and time between exposure and sample collection (i.e. progression of ingesta to the lower GI tract, absorption and excretion).

Although a definitive cause for the severe myopathy in this case could not be determined, the losses stopped when the feed and mineral mix were removed and replaced with a new ration that the lambs seemed to accept better. This observation further suggested a possible association with the feed and mineral mix; nevertheless, multiple factors might have contributed, including young age/rapid growth rate, reduced protection against oxidative damage (presumptive vitamin E deficiency), and additive effect of the ionophore antibiotics lasalocid and monensin. *AHL*

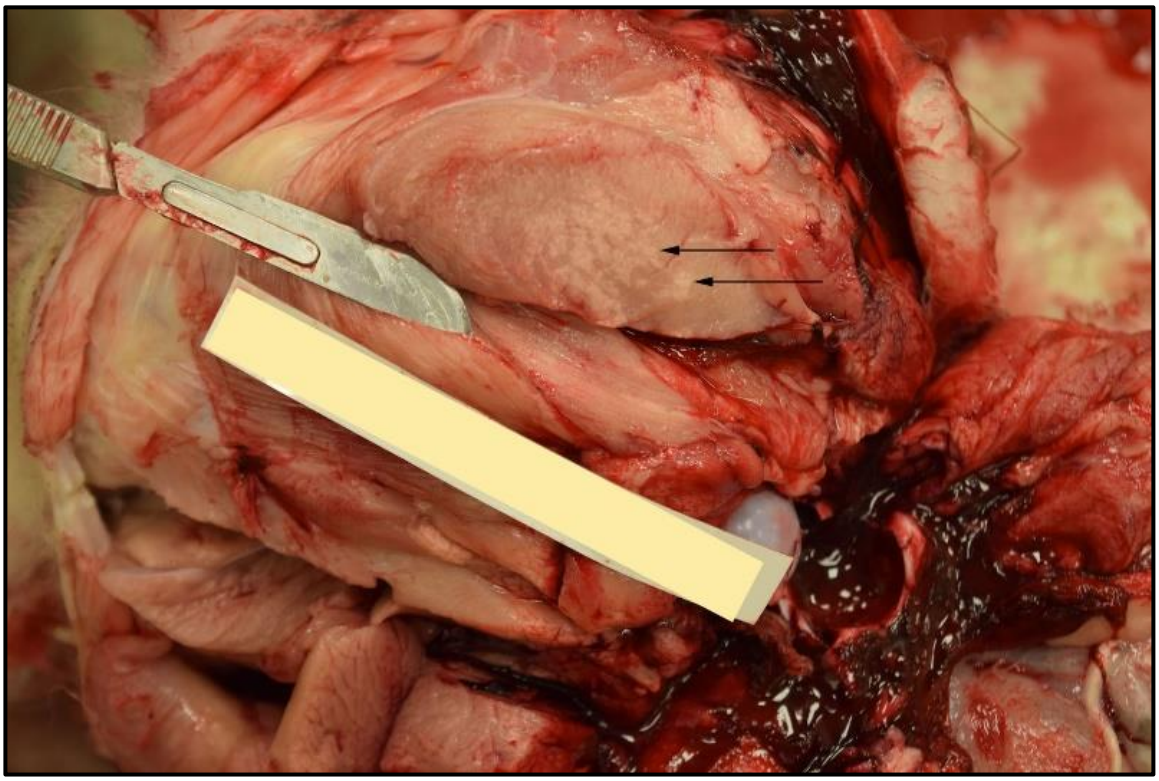


Figure 1. Striated skeletal muscle myopathy, as indicated by white discoloration of the muscle fibers (arrows).

References

1. Radostits OM, Gay CC, Hinchcliff KW, Contstable, PD. Chapter 30 - Diseases associated with nutritional deficiencies. In: Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats, 10th ed. Radostits OM et al, eds. Elsevier, 2007:1746.
2. Monensin – Medicating ingredient brochure, Canadian Food Inspection Agency, June 29 2020. https://www.inspection.gc.ca/animal-health/livestock-feeds/medicating-ingredients/mib/monensin-mos-/eng/1331053867503/1331053926592#a8

CanSpot ASF surveillance testing – reminder for swine veterinarians

Josepha DeLay, Animal Health Laboratory, University of Guelph, Guelph, ON

AHL Newsletter 2020;24(4):10.

The Animal Health Laboratory continues to test appropriate swine cases under the CanSpot ASF surveillance program. Eligible cases are those for which African Swine Fever is not a differential diagnosis, but have features of specific endemic diseases that could potentially mask more definitive ASF lesions or clinical signs.

To qualify for surveillance testing, cases must have herd location information available (PID or physical address); have appropriate samples available for testing; and meet specific disease criteria listed below. For cases meeting these criteria, AHL pathologists communicate with and obtain permission from submitting veterinarians prior to surveillance testing. Veterinarians may also initiate testing through communication with the case pathologist or diagnostician.

To facilitate the success of this important ASF surveillance tool, veterinarians can help by:

- Including required fresh tissue samples (i.e. spleen) with field postmortem cases sent to the lab
- Including a thorough clinical history with each case
- Ensuring that the herd PID or physical address is included
- Responding to pathologists' requests for permission for surveillance testing

Appropriate samples for CanSpot testing:

- spleen, tonsil, kidney, lymph node, terminal ileum, serum

Clinicopathological presentations eligible for CanSpot ASF testing:

1. Septicemia and / or multiorgan hemorrhage such as caused by *E. rhusiopathiae*; *S. suis*; *S. zooepidermicus*; *A. suis*; *S.* Cholerasuis; other bacteria
2. Porcine Reproductive and Respiratory Syndrome virus (PRRS), especially when it causes cyanotic skin
3. Porcine dermatitis and nephropathy syndrome (PDNS) and vasculitis that can be caused by PCV2, PCV3, and other pathogens
4. Hemorrhagic diarrhea / necrotizing enterocolitis such as caused by *Salmonella* spp.; *L. intracellularis; B. hyodysenteriae; B. hampsonii*
5. Fibrinous pleuritis / pericarditis / hydropericardium such as caused by *H. parasuis* (now *G. parasuis*), *S. suis*
6. Mulberry heart disease
7. Splenic torsion
8. Abortion above historical trend for herd

Please contact the AHL or your case pathologist with any questions about the CanSpot ASF program. Thank you for contributing to enhanced ASF surveillance. *AHL*

See also: https://www.uoguelph.ca/ahl/ontario-rolls-out-canspot-asf-enhanced-surveillance-pilot

Detection of *Brachyspira hampsonii* genomovar I in Ontario

Đurđa Slavić, Murray Hazlett

Animal Health Laboratory, University of Guelph, Guelph, ON

AHL Newsletter 2020;24(4):11.

In September of this year, *Brachyspira hampsonii* genomovar I (previously clade I) was detected by qPCR in porcine fecal samples submitted from a sow herd. The results were confirmed by sequencing of the PCR product. Since 2013, all porcine samples submitted to the AHL for qPCR for *Brachyspira* profile testing have been tested for the presence of *B. hyodysenteriae, B. pilosicoli, B. hampsonii* genomovar I and *B. hampsonii* genomovar II, as well as for the presence of *Brachyspira* spp. Whereas in the past *B. hampsonii* genomovar II was detected in samples submitted from out of the province, this is the first time that *B. hampsonii* genomovar I was detected in samples submitted from Ontario. An AHL database search revealed that since January 2018, 120 submissions totaling 276 samples were tested by *Brachyspira* profile qPCR. Eleven cases were positive for *B. hyodysenteriae* and 9 cases were positive for *B. pilosicoli*. Not surprisingly, both pathogens were detected in 3 of these cases, confirming the notion that more than one species of *Brachyspira* can be present in the same animal.

There are different species of *Brachyspira* associated with clinical diseases in grower-finisher pigs including *B. hyodysenteriae*, *B. hampsonii*, *B. pilosicoli*, *B. suantina* and *B. murdochii*. Whereas strongly haemolytic Brachyspiras (i.e., *B. hyodysenteriae, B. suantina* (currently in Europe only), and *B. hampsonii*) are associated with severe mucohemorrhagic diarrhea (**Figs. 1A** and **1B**), the weakly hemolytic ones usually cause colonic spirochetosis characterized by diarrhea and/or colitis (**Fig. 1C**).

Brachyspira hampsonii is a new species of strongly haemolytic *Brachyspira* spp. that has been divided into three different genomovars; namely, genomovar I, II, and III. Genomovars I and II have been associated with severe mucohaemorrhagic diarrhea in North American pigs whereas genomovar III has been detected in pigs and migratory waterbirds in Europe. No differences in clinical signs, gross or microscopic pathology have been observed between genomovar I and II in North American pigs or between disease caused by *B. hampsonii* and *B. hyodysenteriae*.

AHL will continue to investigate any swine dysentery suspect cases in the future to monitor for the presence of different *Brachyspira* spp. in the Ontario swine population. Veterinarians suspecting swine dysentery should submit feces or tissue samples to AHL for *Brachyspira* profile qPCR testing. Culture is also available; however, the laboratory has to be notified in advance since a selective media for culture is made on an as-needed basis. *AHL*

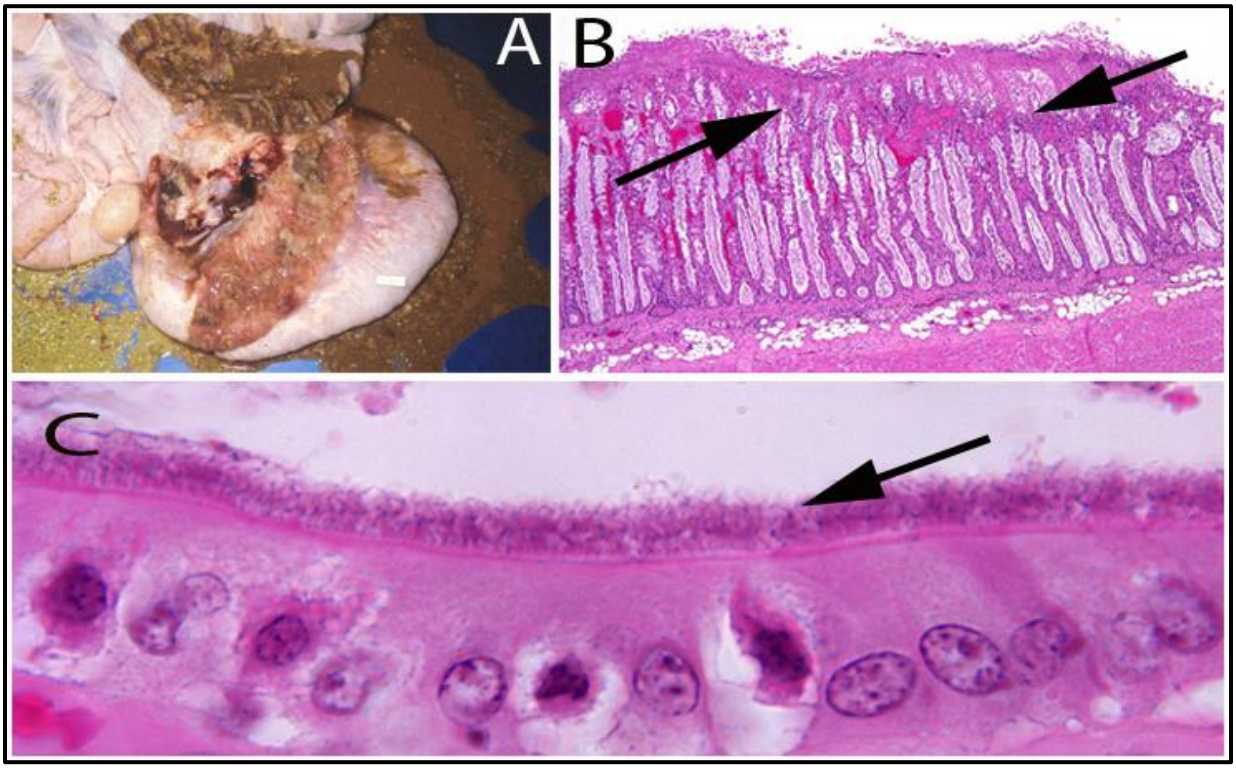


Figure 1. **A**. Mucohemorrhagic enteritis due to *Brachyspira hyodysenteriae* (swine dysentery) courtesy of A.A. van Dreumel. **B.** Swine dysentery showing necrosis and ulceration of superficial mucosa (arrows) (H&E). **C.** *Brachyspira pilosicoli* with typical adherence of organisms to the colonic enterocyte surface producing a "brush-cut" appearance (arrow) (H&E).

Reference

1. Mirajkar NS et al. Characterization and recognition of *Brachyspira hampsonii* sp. nov., a novel intestinal spirochete that is pathogenic to pigs. J Clin Microbiol 2016;54:2942-2949.

OAHN swine small-scale herd postmortem project continues

Josepha DeLay, Tim Pasma

Animal Health Laboratory, University of Guelph, Guelph, ON (DeLay); OMAFRA, Guelph, ON (Pasma)

AHL Newsletter 2020;24(4):12.

The Ontario Animal Health Network (OAHN) has sponsored a new study through the Animal Health Laboratory (AHL) to identify disease issues in small-scale swine herds in Ontario. An important goal of the project is also to facilitate connection and communication between veterinarians and small-scale producers.

To date, 8 submissions have been received from small herds meeting the project requirements (see below). Please continue to encourage your small swine herd clients to participate in this worthwhile project, and to spread the word about the project to other producers with small herds.

Summary of herd requirements for participation in the project:

- The swine herd is located in Ontario and has ≤50 sows, or markets ≤1000 hogs per year;
- The herd has, or is in the process of obtaining, a Premises Identification Number (PID);
- The producer completes and submits a herd management survey (included with submission form);
- The herd veterinarian has enrolled the herd / case in the project.

The project funds postmortems (PM) on pigs that die or are euthanized due to disease, and for which the herd meets the above criteria. PM samples will be tested for a variety of diseases depending on the presenting complaint and the age of the animals. All submissions will be tested for PRRSV and influenza A virus. Test results will be reported to the herd veterinarian who will communicate these findings to the producer.

The costs of PM at the AHL and all diagnostic tests will be covered by the project, at no charge to the client. For cases with an on-farm PM, veterinarians will receive a subsidy for conducting the PM, and all diagnostic test costs will similarly be covered by the project. Importantly, on-farm PMs must follow the project sampling protocol specific for each age group and disease syndrome (see links to submission forms and sampling guides at https://www.uoguelph.ca/ahl/oahn-swine-small-scale-herd-postmortem-project-may-2020).

For more information, to enroll a small herd in the project, and to receive a sampling kit for field PMs, veterinarians may contact Dr. Josepha DeLay at the AHL (jdelay@uoguelph.ca or 519-824-4120 ext 54576). *AHL*

AVIAN/FUR/EXOTIC

Necrotic enteritis in broiler breeder chickens associated with *Ascaridia galli*

Andrew Brooks, Jacob Avula, Kathleen Sary

Animal Health Laboratory, University of Guelph, Guelph, ON (Brooks, Avula), Maple Leaf Foods (Sary)

AHL Newsletter 2020;24(4):13.

A commercial broiler breeder operation reported an increase in mortality after young males were recently introduced (commonly called spikers). Only new males added to this mature flock were affected and mortality started about two weeks after their arrival. Four dead young males were submitted to the AHL for postmortem. Three out of four birds had characteristic lesions of necrotic enteritis (NE) with thick layers of necrotic debris lining the jejunum. One bird with no intestinal lesions had pulmonary hypertension syndrome (ascites). No coccidia were observed in several wet-mount preparations of scrapings of the intestinal mucosa but a few nematode larvae were visible. No adult nematodes were present in the intestinal tracts and there were no other significant gross findings.

Histopathology of the small intestine revealed lesions typical of NE, including areas of mucosal necrosis containing plump bacilli, and large numbers of *Clostridium perfringens* were isolated from the lesions. Interestingly, the affected intestine also contained many parasite larvae burrowing in the mucosal lining (**Fig. 1**). One section of intestine also contained rare coccidia. The AHL Parasitology laboratory identified numerous ascarid larvae consistent with *Ascaridia galli* in scrapings of the intestinal mucosa

(**Fig. 2**). No gastrointestinal nematode eggs or coccidia oocysts were detected in the flotation of a pooled fecal sample.

A. galli is a common parasite of chickens that also infects turkeys, geese, ducks and wild galliform birds (1). The adult parasites are large white roundworms that inhabit the lumen of the small intestine. Male and female adults range in size from 50-75mm and 70-120mm respectively. The life cycle of *A. galli* is a direct one. Birds become infected by ingesting infective eggs in the environment. Following ingestion, the eggs hatch and larvae mature and burrow within the lining of the intestine during the prepatent period. Adult worms in the intestine lumen may live for one year and shed eggs into the environment via the feces. The eggs become infective to other birds after approximately three weeks under optimal environmental conditions. Ascaridia eggs are quite hardy and can survive for several months in cool, moist environments such as poultry litter.

A. galli is not considered highly pathogenic. The majority of infections are asymptomatic, especially in adult chickens. In young chickens, a heavy burden of larvae may produce diarrhea, anemia and reduced weight gain as the parasites migrate within the intestinal lining. Large numbers of adult Ascaridia may also physically obstruct the intestine (1).

In the absence of a significant burden of coccidia, the large number of *A. galli* larvae are a likely predisposing factor to the development of NE in this case, similar to the role of *Ascaridia dissimilis* in turkeys (2, 3). The birds in this submission may have been immunologically naïve and perhaps were exposed to large numbers of ascarid eggs upon joining this established flock. This submission highlights the multifactorial nature of NE and the importance of helminth control programs.

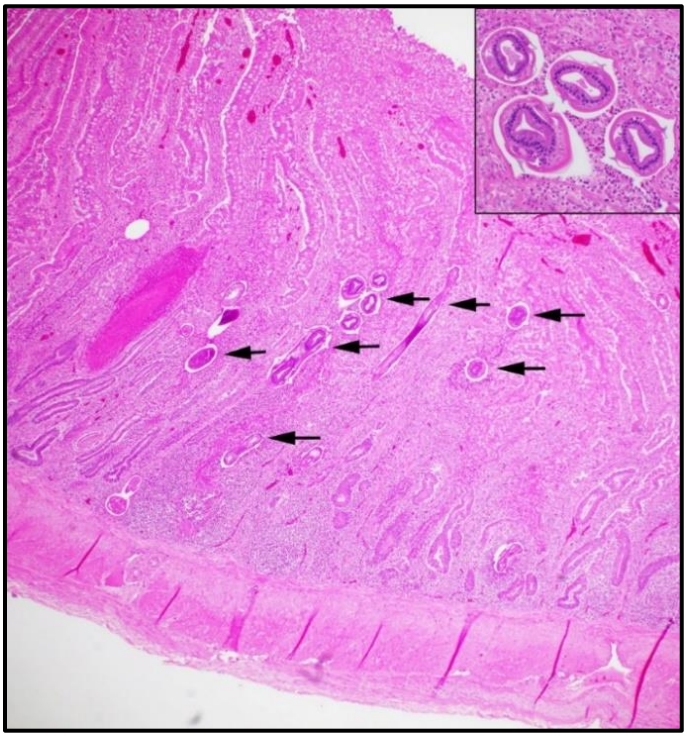


Figure 1. Numerous larvae of *Ascaridia galli* (arrows) burrowing in the mucosa of the small intestine (inset: higher magnification of larvae). (H&E)

Figure 2. *Ascaridia galli* larval stage detected in the mucosal scrapings of the small intestine.

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Lactococcosis in farmed rainbow trout

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AHL Newsletter, 2020;24(4):15.

Over the late summer, a commercial grow-out rainbow trout aquaculture operation had been experiencing slow but sustained daily mortalities. Both regular and triploid trout strains were used, and fish were routinely raised in separate open water cages. Average water temperatures over the period ranged from 17 to 20°C. Mortalities progressively increased, peaking when water temperatures exceeded 20°C and resulting in an overall cumulative mortality rate ranging between ~ 30 to 85%, depending on age group and type (regular vs. triploid trout). During the peak of mortality, on-farm postmortems were performed and a set of representative tissue samples and whole dead fish were submitted to the Animal Health Laboratory for further analysis. Furunculosis, a low-grade bacterial infection caused by *Aeromonas salmonicida,* was initially suspected. Tissues were collected for histopathology and bacterial culture, and furunculosis was ruled out through negative *A. salmonicida* PCR testing of pooled organ samples.

Mortalities tended to sink in the raceways rather than float, making it difficult to retrieve fresh dead fish, and along with the accompanying warm water temperatures resulted in advanced autolysis. Nonetheless, histologically there was mild mixed histiocytic and lymphocytic inflammation within the periocular adipose tissue, angles of the cornea, and along the choroidal layer and vascular rete of the eyes (peri- and endophthalmitis). One eye was partially collapsed with scattered fibrin thrombi within the ocular vascular rete. There were scattered dense colonies of gram-positive coccoid bacteria within these thrombi, as well as within the foci of intraocular and periocular inflammation (**Fig. 1**). Aerobic culture of spleens, kidneys, and gill surface swabs all yielded heavy pure cultures of *Lactococcus garvieae,* consistent with the observed gram-positive cocci. Ongoing on-farm monitoring and sampling of mortalities consistently retrieved heavy pure cultures of *L. garvieae* in subsequent submissions.

Lactococcus garvieae causes a hyperacute hemorrhagic septicemic syndrome in fish called lactococcosis. The disease typically occurs in production systems where water temperatures exceed 15°C. Uni- or bilateral exophthalmia is commonly observed (**Fig. 2**), along with ascites and widespread visceral organ congestion and hemorrhage. Numerous freshwater and marine species of commercial interest are affected, but it is a particularly important emerging disease in fresh water rainbow trout aquaculture where it can lead to significant economic losses. Over the past summer, there have been large outbreaks of lactococcosis in a number of freshwater hatcheries in Southern California, resulting in the destruction of very large numbers of fish (> 3 million) in an attempt to contain the disease.

This is the first documented outbreak of lactococcosis in Ontario farmed fish. Rising ambient environmental temperatures could represent a potential risk factor for this disease in Ontario rainbow trout aquaculture. Clinically, it was opted to treat some groups and not others in a strategic way depending on age, severity of disease, and impending harvest dates. Treated fish were given oxytetracycline. Mortalities subsided in all groups once temperatures decreased back to <18°C.

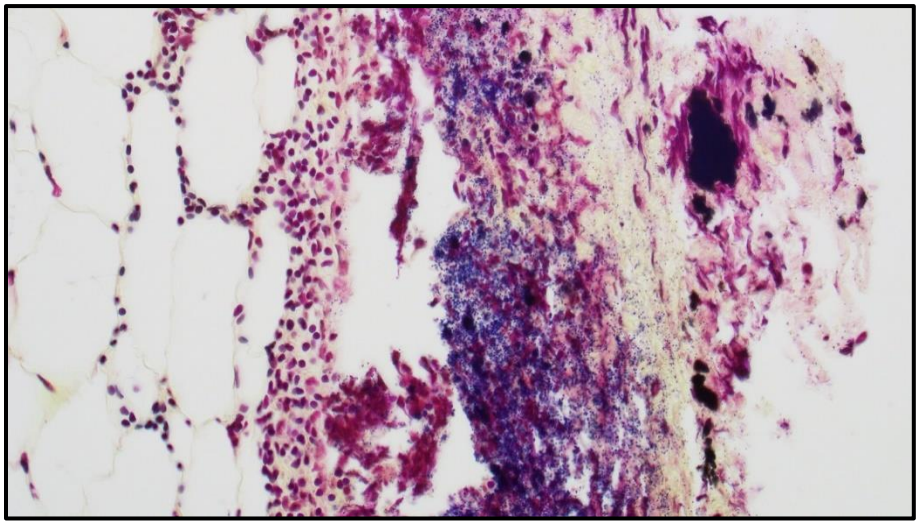

Figure 1. Periocular adipose tissue with lymphohistiocytic inflammation and abundant gram-positive cocci. (Gram stain)

Figure 2. Rainbow trout exhibiting prominent bilateral exophthalmos which was particularly common during peak mortalities when water temperature exceeded 20°C. Courtesy of Véronique LePage.

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Yew (*Taxus* spp.) toxicosis with reference to horses

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AHL Newsletter 2020: 24(4):17.

An adult male saddle-horse was submitted for emergency autopsy due to sudden collapse and death in its stall while being groomed. At autopsy, blood was present in the nares. There was marked pulmonary congestion and scattered foci of hemorrhage in lung. The stomach was filled with fine fibrous ingesta in which were found three short 6-7 mm lancet-shaped fragments of evergreen leaves, suspicious for yew (*Taxus* spp.) among gastric content. Further investigation revealed that while being ridden that day, the horse had stopped and nibbled on a yew bush.

Taxus spp. (**Fig. 1**) is the most commonly-diagnosed plant toxicosis at the AHL. A review of pathology cases from 1989 to Oct 2020 found 25 submissions (10 cattle, 8 equids, 2 goats, 2 sheep, 1 turkey and 1 deer) (**Table 1**). Five of the equine submissions involved two or three animals.

Figure 1. *Taxus* spp. (yew) showing typical evergreen leaves and red fleshy fruit (A). Note the fine point at the tip of the needle-like leaves (B).

Diagnosis is usually made by a history of unexpected death and finding the typical leaves in stomach or mouth. Stomach content can also be tested at an external laboratory for taxine, the toxin which is a cardiotoxic alkaloid that interferes with cardiac conduction. Death is rapid, often within 1-3 hours of ingestion, although this is dose-dependent. There is no treatment for the acute syndrome. Any prunings or plant material should be immediately removed from access by the herd. Horses are more sensitive to the toxin than ruminants, pigs or dogs.[1] Depending on how long the animal lives, there may not be histologic lesions visible in the heart. *AHL*

Species	Breed	Dead	At Risk	History
Equine	Miniature Donkey	1	?	Sudden death. Suspect yew toxicity.
Equine	Draft x	1		Collapsed while being groomed and died.
Equine	Horse	2	10	2 dead. Seen running frantically and screaming, then dropped dead.
Equine	Thoroughbred	1	?	Found dead in field. No evidence of thrashing.
Equine	Donkey	2	6	2nd donkey death in 12 hrs. Plants were in some fill that arrived at farm.
Equine	Standardbred	2	11	2 dead, Yew bushes had been pulled out and had been in pasture for about 1 week and horses had access to this.
Equine	Equine	3	?	Three horses found dead in field 2-20 ft apart, the other 200 feet away.
Equine	Tb & pony	2	1	Changed from round bales to smaller regular bales recently and snow cover on ground. These changes probably accounted for the horses' recent interest in the yew plants after two months of access to these plants growing next to a deserted house on the pasture.
Bovine	Mixed	2	11	Sudden death 2 of 11 cows over 24hrs. Owner reports 1 cow was walking behind him, fell, died. Shrubs compatible with *Taxus* spp. were found in burn pile accessible by cattle.
Bovine	Jersey	2	70	Sudden death. Oct. 10 found 1 dead, no sickness seen. Nov. 16 found dead no sickness seen.
Bovine	Cattle	2	31	Pregnant beef cows. Suddenly dead this morning. Found in rumen some vegetation that might be yew.
Bovine	Unknown	2	3	Escaped pasture Saturday AM. Owner concerned may have injested toxic substance.
Bovine	Limousin	3	35	
Bovine	Simmental	3	65	Date/Time of Death: 05/07/20 10AM, died Clinical History: Suspected Yew shrub poisoning.
Bovine	Cattle	4	27	4 dead. Sudden mortality overnight. Cattle have access to a burn area on which a quantity of evergreen shrubs were dumped.
Bovine	Beef	2	35	2 dead, 35 cow calf found dead in field near stream.
Bovine	Holstein	4		4 dead out on pasture - some swampy areas.
Bovine	Holstein	2	20	Yew poisoning.
Caprine	Goat	1	20	1 dead. feeding: evergreen clippings.
Caprine	Alpine	3	7	Found dead. Had eaten some yew.
Ovine	Sheep	4	?	4 dead. 3 dropped dead overnight and one this morning.
Ovine	Black bahamiam	4	6	Owner, who trimmed a yew hedge on the farm, and fed the clippings to this ram.
Deer	Fallow Deer	1	170	
Turkey	Turkey	1	?	

Table 1. *Taxus* spp. AHL pathology submissions, species affected and histories, 1989 - October 2020.

Reference

Tiwary AK et al. Diagnosis of *Taxus* (Yew) poisoning in a horse. J Vet Diagn Invest 2005;17:252-255.

Papulaspora equi, a rare cause of fungal keratitis

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AHL Newsletter 2020;24(4):19.

Corneal scrapings from a 12-year old Hanoverian mare presented with a non-healing corneal ulcer were submitted for cytology, fungal and bacterial (aerobic and anaerobic) culture to AHL. The cytology smears contained scattered individual squamous epithelial cells intermixed with moderate numbers of neutrophils. Mild epithelial cell dysplasia characterized by increased cytoplasmic basophilia and several small aggregates of lytic cellular material were noted. In among this material were low to moderate numbers of septate, branching fungal hyphae. Occasional hyphae were also present within the backgrounds of the slides (**Fig. 1**).

There was no bacterial growth either on aerobic or on anaerobic culture whereas fungal culture yielded growth of black pigmented fungus. This fast-growing fungus was submitted to the reference laboratory for final identification and was identified as *Papulaspora equi*. Search of scientific literature revealed only one published report of isolation of *P. equi* from a case of equine keratitis. It was hypothesized that the fungus was introduced into an eye by contaminated plant material while horse was grazing. *P. equi* has also been reported as a rare cause of human keratitis with 5 cases over a 5-year period. In 2 cases, previous eye injury was reported. Whereas there is no treatment information available for this equine case, it has been reported that all human cases responded well to conventional topical antifungal medication. *AHL*

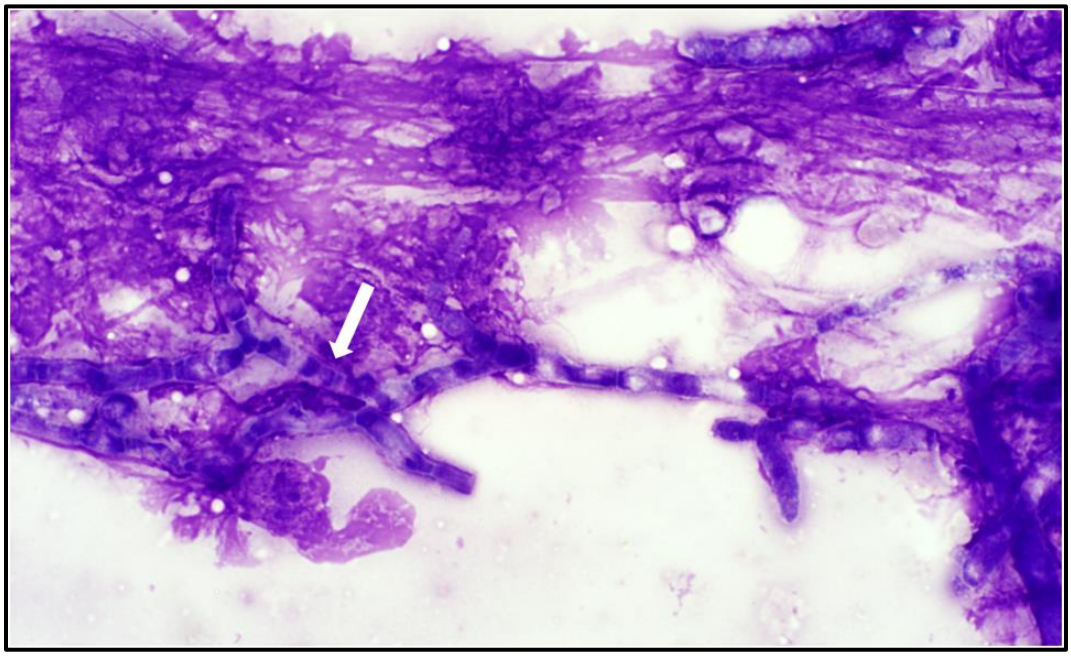

Figure 1. A cluster of septate, branching fungal hyphae (an arrow) embedded within lytic cellular debris. (Wright's stain) Image courtesy of Katherine Morrison.

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Pasteurella spp. infections of the lower respiratory tract in dogs and cats

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AHL Newsletter 2020;24(4):20.

From mid-2007 to Sept 2020, *Pasteurella* spp. were isolated from respiratory tract samples of 18 dogs and 25 cats (**Table 1**). Only cases that had accompanying pathology testing were included in this analysis. Most of the samples processed for bacteriology were lung tissue, but there were also some swabs and lavage samples. In only 5 cases (2 cats and 3 dogs), species identification of *Pasteurella* could not be confirmed and these were reported only to the genus level. When identified to the species level, as expected, *P. multocida* was predominantly isolated from cats (15), followed by *P. dagmatis* (8). In contrast, *P. canis* (9) was the most frequent isolate from dogs, followed by *P. dagmatis* (4). Other *Pasteurella* spp. were isolated sporadically from both dogs and cats (**Table 1**). In a few cases, more than one species of *Pasteurella* was isolated from dogs (2 cases) and cats (3 cases). Histologically, pneumonia and septicemia were the most commonly-diagnosed conditions (**Fig. 1**).

Pasteurella spp. are common members of bacterial flora of upper respiratory tract and oral cavity of dogs and cats. They usually cause opportunistic infections in their hosts, frequently in combination with other pathogens. *Pasteurella* spp., predominantly *P. multocida*, are also implicated in bite wound infections in other animals, including humans. In addition, *P. multocida* occasionally causes primary infections such as fowl cholera in poultry and hemorrhagic septicemia in swine, cattle, and water buffalo. *AHL*

Pasteurella species	Feline	Canine
Pasteurella spp.	2	3
Pasteurella canis	2	9
Pasteurella dagmatis	8	4
Pasteurella multocida	15	2
Pasteurella oralis	1	0
Pasteurella stomatis	0	2
Sum:	**28**	**20**

Table 1. Isolates of *Pasteurella* spp. from lower respiratory tract of canine and feline autopsy cases, 2007-2020.

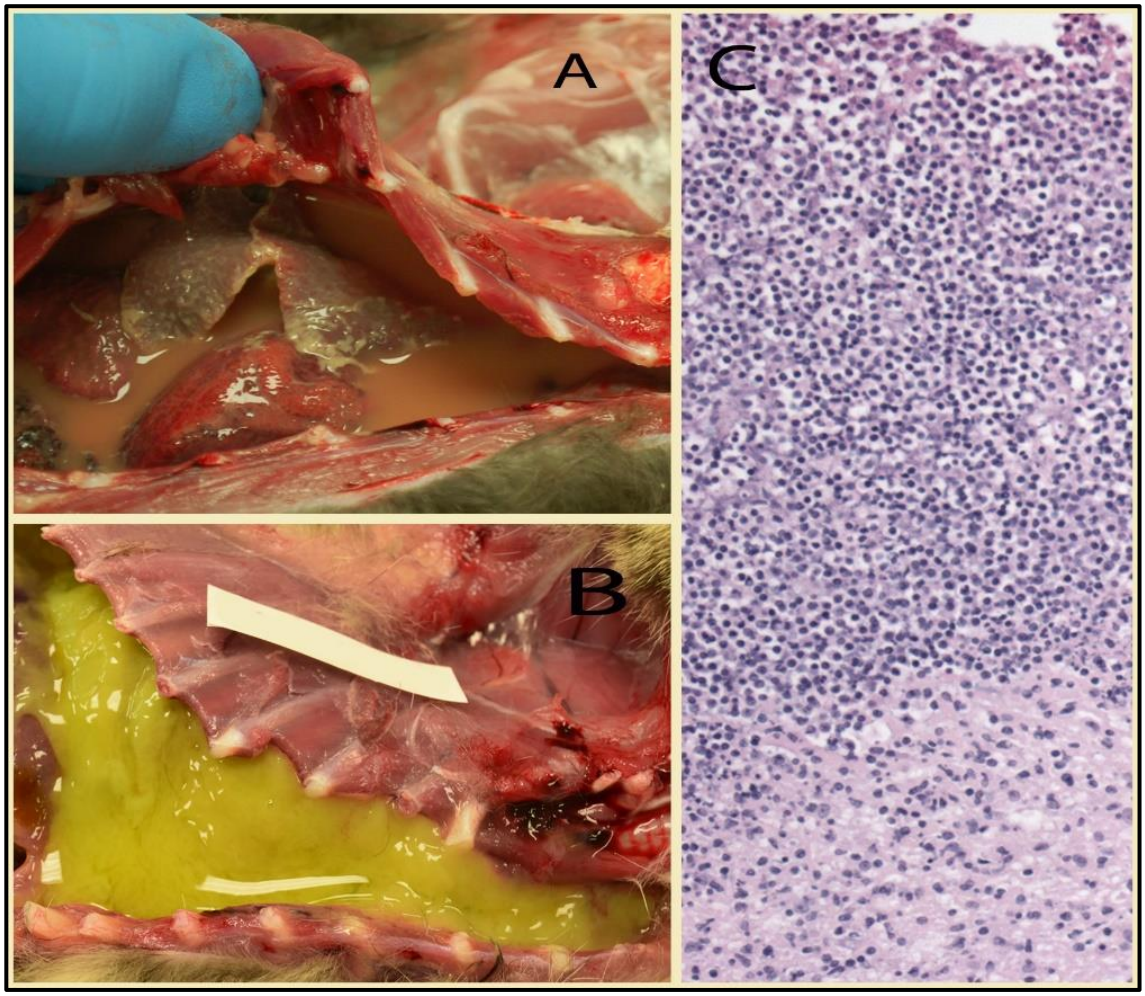

Figure 1. A. *Pasteurella dagmatis* pleuropneumonia in a 6-month-old cat. A pure culture was isolated. **B.** Pleuropneumonia associated with *Pasteurella oralis* (3+) and *Salmonella* S. I:4,5,12:i:- (2+) in a 12-month-old cat. **C.** Histology from B, showing large outpouring of neutrophils overlying pleural surface. (H&E)

Extramedullary (gastric) plasmacytoma in a dog

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AHL Newsletter 2020;24(4):21.

An 8-year-old female spayed Shi Tzu presented for evaluation of intermittent vomiting and diarrhea. A complete blood count (CBC) demonstrated a mild non-regenerative anemia (PCV 33%) and a serum biochemistry noted moderate hyperkalemia (5.7 mmol/L), moderate hypoalbuminemia (18 g/L), and marked hyperglobulinemia (60 g/L). Spec cPL, cobalamin, and folate were all found to be within normal reference intervals. No ova or parasites were seen in the fecal sample. An ACTH stimulation test ruled out hypoadrenocorticism. Urinalysis was unremarkable.

An abdominal ultrasound demonstrated a 3.6 cm x 2.9 cm heterogeneous mass of the gastric wall, gastric lymphadenopathy, and scant ascites. The finding of a mass with regional lymphadenopathy was

suggestive of metastatic malignant neoplasia. The packed cell volume (PCV) had decreased to 23%. Ultrasound guided - fine needle aspirates (FNA) of the gastric mass and the enlarged gastric lymph nodes were collected and submitted to the Animal Health Laboratory, University of Guelph, for cytological evaluation. Examination of the smears from both aspirated tissues demonstrated a monotypic population of plasma cells with 4-fold anisocytosis and 2-fold anisokaryosis (**Fig. 1)**. The cells contained moderate quantities of basophilic cytoplasm, distinct paranuclear clearing and eccentrically located, round to oval nuclei with coarsely clumped chromatin and no visible nucleoli. Binucleated cells and mitotic figures were frequently identified. Some of these cells contained globular cytoplasmic inclusions composed of immunoglobulins (Russell bodies), compatible with Mott cells. These findings were consistent with a diagnosis of extrameduallary (gastric) plasmacytoma with spread to the regional lymph nodes.

Urine was submitted for Bence-Jones proteinuria, and blood was collected for PCV re-assessment and serum protein electrophoresis. The PCV had declined further to 18%. The urine was positive for Bence-Jones proteins, indicating the presence of the light chain portion of the increased M component of the immunoglobulin (1, 2). The protein electrophoresis results (**Fig. 2**) indicated marked progressive hyperglobulinemia (72g/L) and relative (compensatory) hypoalbuminemia (18g/L.) The hyperglobulinemia was characterized by increased gamma globulins, outlined by a narrow-based peak, consistent with a monoclonal gammopathy.

A diagnosis of multiple myeloma may be established when 2 of the following 4 criteria are met: 1) monoclonal gammopathy, 2) Bence-Jones proteinuria, 3) 20% infiltration of the bone marrow, liver, or spleen by plasma cells, and 4) punched-out bony lesions evident on radiographs (3). The serum protein electrophoresis, Bence-Jones protein urine test, and cytology results satisfied criteria 1, 2, and 3; however, since infiltration of the bone marrow with neoplastic plasma cells could not be investigated in this case, a diagnosis of extramedullary (gastric) plasmacytoma with metastasis to regional lymph nodes was preferred.

Treatment with the chemotherapeutic drug melphalan along with prednisone (4) was recommended. The long-term prognosis for multiple myeloma is generally good in dogs treated with this protocol, resulting in a median survival time of 540 days (4). Using this therapy, 43% of dogs achieved complete remission, 49% achieved partial remission, and only 8% showed no response (3). However, as this patient displayed multiple negative prognostic factors, the long-term prognosis was poor (3), and the owner opted for euthanasia. *AHL*

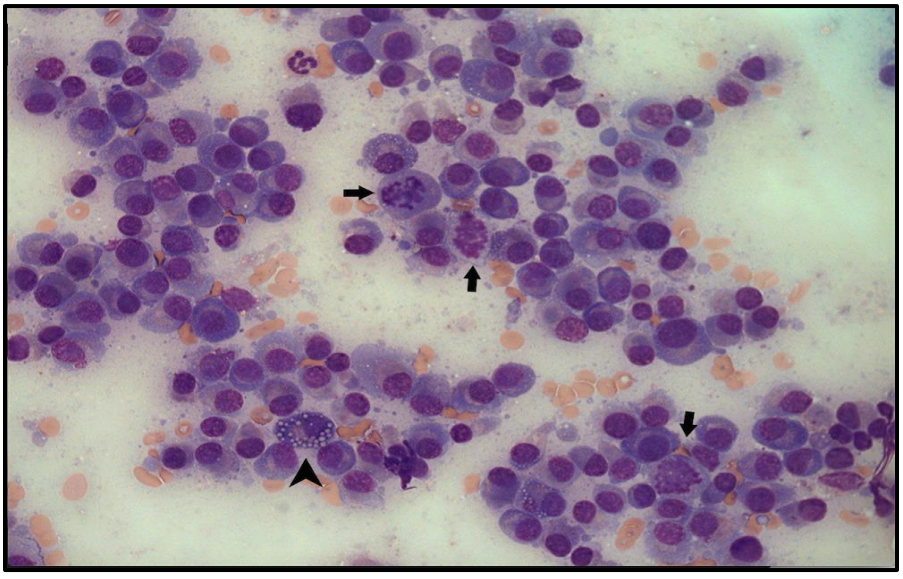

Figure 1. Gastric mass aspirate showing a monotypic population of neoplastic plasma cells with increased mitotic activity (arrows) and intracytoplasmic Russell bodies (arrowhead). Wright's (400X)

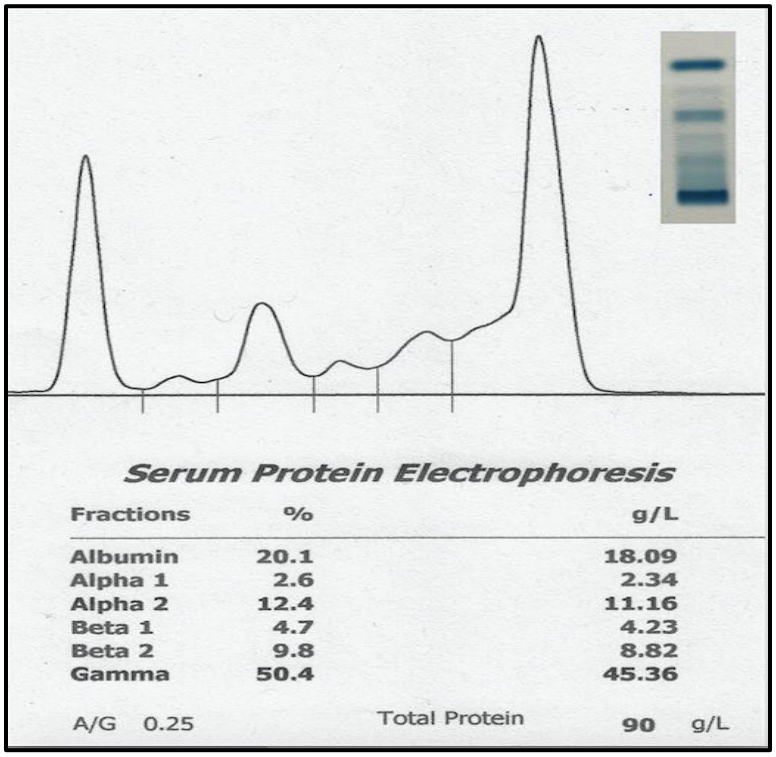

Figure 2. Serum protein electrophoresis. The discrete band at the bottom of the cellulose acetate strip (upper right) is represented by a narrow-based peak in the gamma globulin region of the densitogram, consistent with a monoclonal gammopathy.

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