Laboratory Services Division
Animal Health Laboratory
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AHL Newsletter

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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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AHL holiday hours 2025/2026

Except for Thurs. Dec. 25 (closed – no service), AHL-Guelph is open every day from Wed. Dec. 24, 2025, until Thurs. Jan. 1, 2026, with limited services. The University of Guelph is officially closed during this period.

Sat. Dec. 20	Guelph: Open for specimen receiving, emergency mammalian postmortems, full bacteriology set-up, as well as clinical pathology testing; Kemptville closed
Sun. Dec. 21	Guelph: Open for specimen receiving, emergency mammalian postmortems; Kemptville closed
Mon. Dec. 22	Guelph and Kemptville: All laboratory sections open with full service
Tues. Dec. 23	Guelph and Kemptville: All laboratory sections open with full service
Wed. Dec. 24	All laboratory sections open with limited services (Guelph - 9:00 am to 5:00 pm; Kemptville 8:30-4:30 pm)
Thurs. Dec. 25	Guelph and Kemptville laboratories closed
Fri. Dec. 26	Guelph: Open for specimen receiving, emergency mammalian postmortems; Kemptville closed
Sat. Dec. 27	Guelph: Open for specimen receiving, emergency mammalian postmortems, full bacteriology set-up, as well as clinical pathology testing; Kemptville closed
Sun. Dec. 28	Guelph: Open for specimen receiving, emergency mammalian postmortems; Kemptville closed
Mon. Dec. 29	All laboratory sections open with limited services (Guelph - 9:00 am to 5:00 pm; Kemptville 8:30-4:30 pm)
Tues. Dec. 30	All laboratory sections open with limited services (Guelph - 9:00 am to 5:00 pm; Kemptville 8:30-4:30 pm)
Wed. Dec. 31	All laboratory sections open with limited services (Guelph - 9:00 am to 5:00 pm; Kemptville 8:30-4:30 pm)
Thurs. Jan. 1	Guelph: Open for specimen receiving, emergency mammalian postmortems; Kemptville closed
Fri. Jan. 2	Guelph and Kemptville: 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

Note: System generated invoices are scheduled for Dec 26th. The next run will be on Jan 2nd, 2026.

Update from the Director

The view from the Director's office

OASV, OAPV, OABP, OVMA, SRVO – these are just a few of the conferences that I and other AHL veterinarians have attended this fall or will be attending in early winter. It seems to be the season for conferences, and what a great time to network with colleagues and learn new information from researchers and updates from a wide range of veterinary professionals. Conferences and meetings are so important in supporting continuing education, and indeed, is a requirement for maintenance of CVO licensure and most specialty boards accreditations. I always leave a conference re-energized by new ideas that stimulate further reading, discussion or investigation.

So important is continuing education in maintaining ongoing competency as a clinician or veterinary specialist that it forms one of the criteria for annual performance evaluation of AHL veterinarians. Fortunately, one of the few positive outcomes of the pandemic is the availability of on-line webinars and meetings that make continuing education opportunities less expensive and less time-consuming than in the past. I hope that you have the opportunity to engage with other veterinary professionals and to gain some valuable insights at a meeting / conference / webinar near you.

Best wishes to you and your families for a wonderful and memorable holiday season!

Maria Spinato, Director

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

Specimen reception update

Tim Pasma, Jennifer Zoethout

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

AHL Newsletter 2025;29(4):4.

Cold weather shipping

As winter approaches and the weather becomes colder, please remember to package submissions to prevent freezing of samples. Freezing will damage samples such as EDTA blood and cause artifacts in formalin-fixed tissues. In cold conditions, please use an insulated package with an ice pack at room temperature to help keep samples from freezing. To prevent formalin from freezing, add 1mL of ethanol per 10mL of formalin.

Shipping samples for highly pathogenic avian influenza (HPAI) cases

With the fall migration of birds underway, there is an elevated risk for avian influenza. If you suspect a case of HPAI, you must contact your local CFIA District Office for guidance.

When swabbing birds, please use viral transport media tubes with swabs because swabs with wooden handles are not suitable for testing. On the tubes, indicate whether the samples are oropharyngeal (OP) or cloacal (CL) and pool the swabs by 10 birds. **Do not mix oropharyngeal and cloacal swabs in the same tube.**

After swabbing the bird, swirl the swab in the media, squeeze out the fluid from the swab on the inside of the tube and discard the swab. After collecting the samples, disinfect the outside of the tubes, double bag the samples, and disinfect the outside bag.

If you deliver the samples to the lab, please do not enter our facility but remain in your vehicle and call 519-824-4120 ext. 54530 in Guelph or 613-258-8320 in Kemptville. A staff member will come to your vehicle and retrieve your samples. If you send the samples by courier, put an “S” for suspect or “M” for monitoring on the outside of the box. This will alert staff that the samples are to be tested for HPAI. Do not put any other samples with submissions for HPAI testing.

Birds that are submitted for postmortem may be tested for HPAI before the postmortem is started. This may result in slight delays in reporting postmortem results.

OAHN Update – December 2025

Mike Deane, Tanya Rossi

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

This fall, the OAHN networks have completed and published veterinary and producer reports and species-specific resources. We anticipate a busy winter, with the completion of many active research projects, as well as new reports and resources.

Factsheet: Asian longhorned tick – An encroaching threat

The OAHN Bovine Network created a new factsheet to help vets and producers learn about the Asian longhorned tick. This resource provides information about the tick, its health and epidemiological impacts, early detection, and control measures. You can view this resource here: Factsheet: Asian longhorned tick – An encroaching threat.

Fish Network Courses

Over the past two years, the OAHN Fish Network has created four free courses for aquaculture producers and fishers. These courses are available through Thinkific.

- Working Effectively with an Aquaculture Veterinarian – Thinkific Course
- Biosecurity for Aquaculture Producers – Thinkific Course
- Humane Harvest for Recreational Fishers – Thinkific Course
- Humane Slaughter for Aquaculture Producers – Thinkific Course

New Reports

These are the most recent reports published by OAHN. We publish regularly, so be sure to check back in between newsletters to see what's new. To view any of the veterinary reports below, please click on the link for each report, or go to OAHN.ca and navigate to the species in which you are interested.

Swine Network – Q2 2025 Vet Report

- Senecavirus A (SVA) Ontario update
- PEDV / PDCoV cases have decreased in Q2 2025
- OAHN Veterinary Clinical Impression Survey - Veterinary Comments
- Animal Health Laboratory Immediately Notifiable Disease Review
- Laboratory Diagnostic Reports
- Ontario Slaughter Statistics
- CanSpotASF Surveillance Update
- OAHN Projects - Now Accepting Samples!
- International Disease Topics of Interest Summary

Poultry Network - Q3 2025 Vet Report

- Avian metapneumovirus (aMPV) detections status and vaccines

- Poultry Veterinary Survey Highlights – Q3 2025
- Events and News

Bovine Network - May-Jul 2025 Vet Report

- Global Surveillance Update
- Q2 Bovine Data from AHL
- Bovine Mineral Testing 2022-2025
- HPAI in Dairy Cattle Update

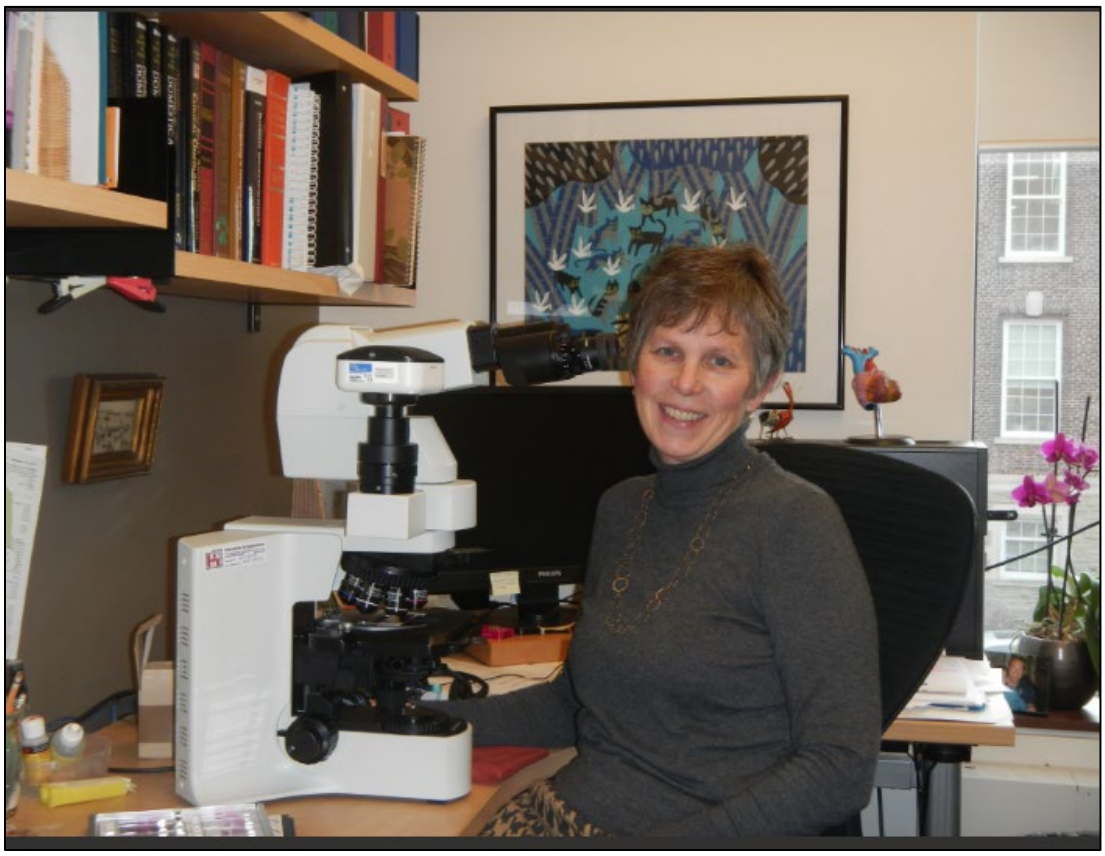
Equine Network - Q2 2025 Vet Report

- Bits N Snips
- Infographic – Fevers of Unknown Origin
- Infographic – Potomac Horse Fever in Ontario
- Network Member Reports
- Syndromic and lab surveillance dashboard
- Equine Research
- Ontario equine disease surveillance summary

Companion Animal Network - May-Aug 2025 Veterinary Need-2-Know Update

- OAHN summer survey and lab data: Key results
- Vaccine-strain canine distemper cases
- Rabies update: Bats bats bats bats
- Salmonella in people: Dog food / treats link
- CAPCvet graphs
- Nasty & noteworthy parasites
- H5N1 flu: Still here
- Update: Lyme disease infographic

Staff highlights



Dr. Josepha DeLay is retiring after 25 years' service at the AHL. Josepha obtained undergraduate degrees from Dalhousie University prior to obtaining her DVM and DVSc degrees at the Ontario Veterinary College. Between her professional studies, she worked as a private veterinary practitioner in New Brunswick. Following brief stints as a senior resident in anatomic pathology at OVC and a surgical pathologist practice, she joined the AHL in 2000. Here, she worked diligently to start up the immunohistochemistry section of the histotechnology lab which she supervised for many years. Josepha managed the AGCO program and specialized in swine pathology which led to her tenure as the AHL pathologist on the OAHN swine network. She is highly regarded by all of the AHL clients that she served with her technical expertise, as well as the many pathologists that she mentored over the years. We wish her much joy, happiness and good health in her retirement. Congratulations Josepha!

Linda Little has retired after 25 years of service at the AHL. Linda worked as a technician in the Virology serology/immunology unit for 14 years before assuming the position of Ontario Hatchery and Supply Flock technician in 2014. In this role, she supported the testing requirements and associated documentation for hatcheries and supply flocks throughout Ontario. Linda brought great enthusiasm to her responsibilities and worked with many in industry and government who appreciated her dedication. We wish her the best in her retirement. Congratulations Linda!

RUMINANTS

Theileriosis in a dairy cow from eastern Ontario

Kristiina Ruotsalo, Hugh Cai, Tim Pasma

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

AHL Newsletter 2025;29(4):9.

A 3-year-old Holstein cow, imported from the USA in July of this year, exhibited signs of malaise including pale mucous membranes, decreased appetite and milk production following participation at a local livestock show. EDTA blood and serum were submitted for CBC and biochemistry profile. The CBC revealed marked anemia with hematocrit of 0.15 L/L (reference interval 0.21-0.30 L/L), hemoglobin 43 g/L (reference interval 84-120 g/L), in addition to mild neutropenia and mild to moderate lymphocytosis. The biochemistry profile was unremarkable except for a marginal increase in total bilirubin of 5 umol/L (reference interval 0-3 umol/L). Evaluation of the peripheral blood smear confirmed a marked, highly responsive anemia characterized by an average of five polychromatic erythrocytes per 40x field, and the presence of frequent basophilic stippling of erythrocytes. Basophilic stippling is not uncommon with highly regenerative anemia in ruminants, and the presence of any polychromatic erythrocytes is indicative of a significant regenerative response. Of greatest importance was the presence of frequent individual and rare pairs of oval to linear, to signet-ring shaped piroplasms within erythrocytes which were consistent with *Theileria* (**Fig. 1**). Universal 18S rRNA gene PCR sequencing at the AHL indicated that the blood sample was positive for *Theileria orientalis* complex.

Theileria is an immediately notifiable disease by laboratories to the Canadian Food Inspection Agency (CFIA) and to the Office of the Chief Veterinarian for Ontario; therefore, these agencies were notified. Remaining EDTA blood from this cow was submitted for further analysis to the CFIA. The sample was confirmed to be positive for *Theileria orientalis* Ikeda genotype.

This is the first known case of *Theileria orientalis* genotype Ikeda in both Ontario and Canada. *Theileria buffeli* (now reclassified as *T. orientalis* genotype Buffeli) was previously identified in a dairy cow, also from eastern Ontario (AHL Newsletter 2015;19(1):7).

Theileria are obligate intracellular protozoan parasites which infect erythrocytes and leukocytes. *Theileria orientalis* includes eleven identified genotypes. Three main genotypes have been identified in the United States: Ikeda, which is often associated with the most severe clinical signs including anemia, ill thrift, abortions and death in all ages of cattle, Chitose, with variable clinical signs, and Buffeli, often resulting in limited to no clinical signs. Cattle can be infected for life, especially with Ikeda, and long-term impacts on production, along with potential recrudescence of disease during times of stress may be noted. *T. orientalis* Ikeda has caused major economic losses in Asia, New Zealand and Australia. The primary tick vector is *Haemaphysalis longicornis* (Asian longhorned tick) which was identified in the U.S. in 2017 in Virginia, (and possibly earlier, when archived tick samples were studied). As of July 2025, these ticks have been detected in 19 states.

H. longicornis are three-host ticks, with larvae, nymphs, and adults feeding on a wide range of wild and domestic species including birds, white-tailed deer, companion animals, livestock, horses and humans.

Once introduced into a suitable habitat, *H. longicornis* numbers can increase rapidly due to their bisexual nature, and ticks are also able to reproduce parthenogenetically. Ticks can remain infected on pasture for up to two years under favourable conditions. As of early 2025, *H. longicornis* has not been confirmed as established in Canada.

Whenever anemia is suspected or identified in cattle, initial diagnostic steps should include a comprehensive CBC with a detailed examination of a peripheral blood smear by a veterinary clinical pathologist. Ideally, an air-dried, unstained peripheral blood smear, made at the time of blood collection, should be submitted along with the EDTA sample to the laboratory. Sample aging artifact may obscure cellular details sufficiently to mask the presence of low numbers of organisms, making slide preparation at the time of sample collection essential. A concurrent serum biochemistry profile may also be helpful in further characterizing the potential cause of anemia. If the cause of anemia remains unclear, or if organisms suspicious for *Theileria* are identified, further testing by PCR can be undertaken. The Animal Health Lab has adopted and validated a qPCR assay for the detection of *Theileria* spp. (test code: thsppcr). Positive samples can be further tested by DNA sequencing to identify the species and genotype.

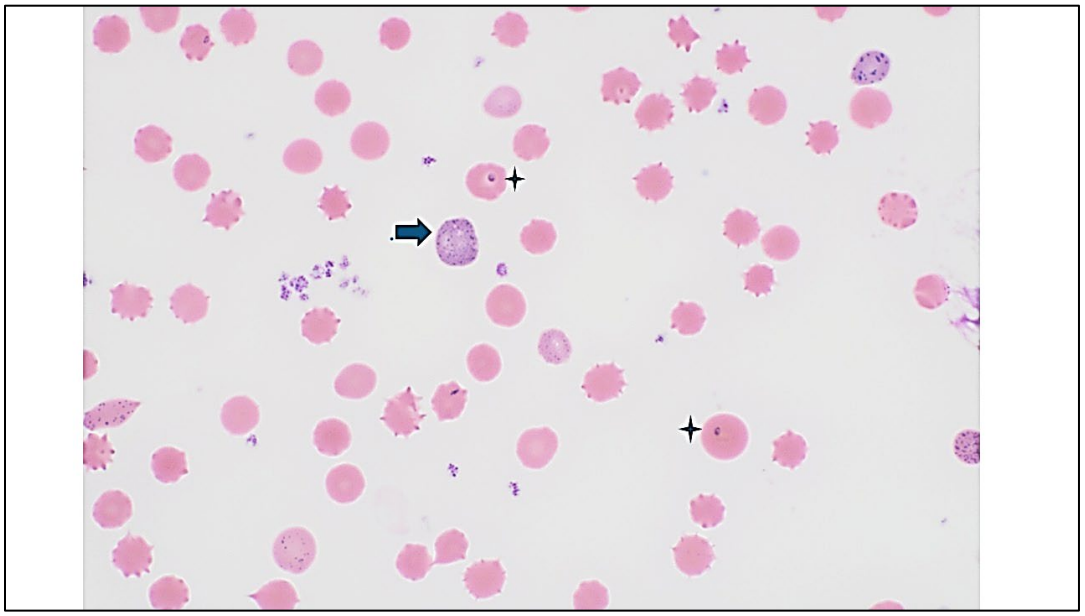


Figure 1. Peripheral blood smear with evidence of polychromasia with basophilic stippling (arrow) and intraerythrocytic piroplasms of *Theileria orientalis* Ikeda (stars). H&E stain.

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6. United States Department of Agriculture Emerging Risk Notice January 2021 *Theileria orientalis* Ikeda.

SWINE

What is your diagnosis? Congenital swinepox

Josepha DeLay, Hannah Jansen

Animal Health Laboratory, University of Guelph, Guelph ON (DeLay), South West Vets, Stratford, ON (Jansen)

AHL Newsletter 2025;29(4):11.

The September 2025 edition of the Animal Health Laboratory (AHL) Newsletter described a case with lesions in neonatal pigs. Multiple discrete ulcerative and proliferative, crusted cutaneous and oral lesions were present at birth in 2 piglets in a single litter from a 1600 sow herd. Lesions involved haired skin, tongue, lip margins, and distal limbs, including coronary bands (**Fig.1**). The sow was unaffected. Similar lesions had been noted sporadically in few piglets in litters from sows of various parities.

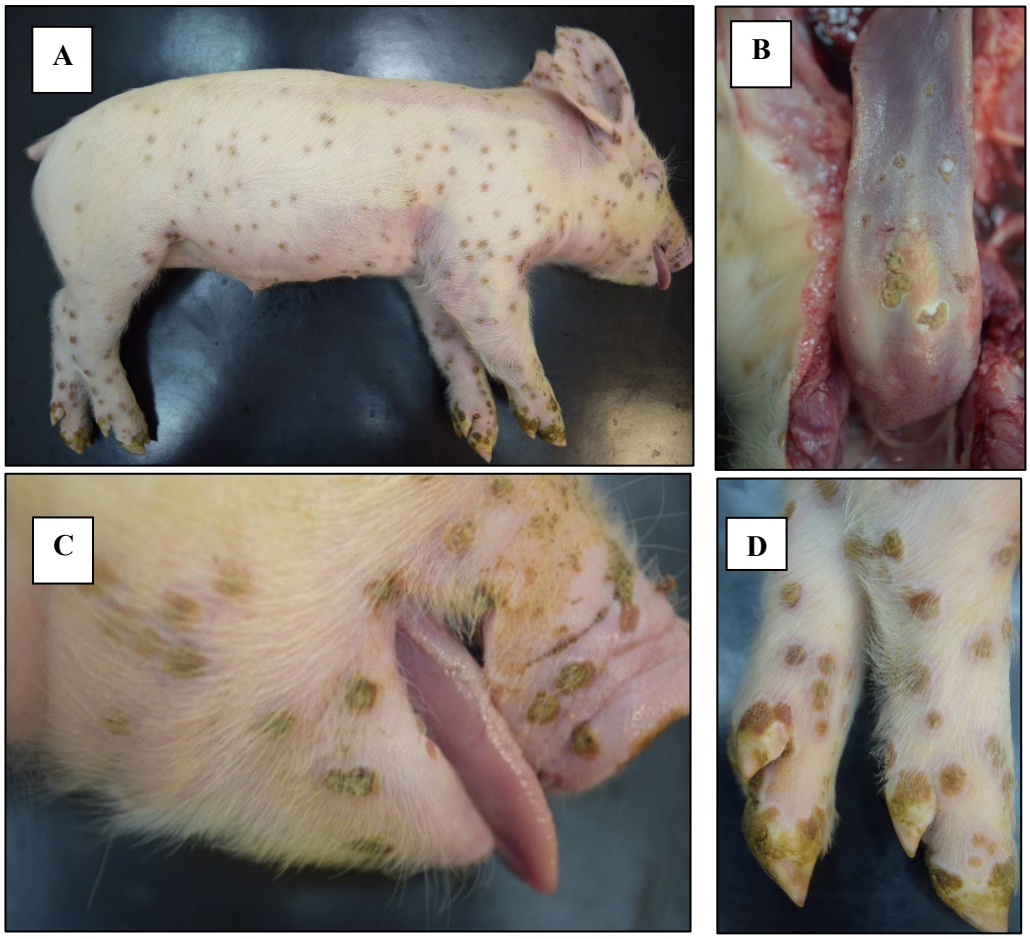

Figure 1. Congenital skin and oral mucosal lesions in a neonatal piglet. Numerous discrete ulcerated and proliferative lesions were present in (A) haired skin over the entire body, (B) the mucosal surface of tongue, (C) mucocutaneous junction at the lips and snout, and (D) distal limbs, including coronary bands.

Gross postmortem and histologic examination were carried out on a representative neonatal piglet. The piglet was in good body condition and was well hydrated. Significant gross lesions were limited to skin, mucocutaneous junctions, and tongue, as described above. Histologically, skin and mucosal lesions were similar at all anatomic sites and consisted of discrete foci of epithelial proliferation and ulceration (**Fig. 2**). Intact epithelium at the periphery of lesions was markedly thickened (hyperplastic), and superficial squamous epithelial cells were severely swollen, with clear cytoplasm, consistent with hydropic degeneration. Small discrete eosinophilic intracytoplasmic inclusion bodies, compatible with poxvirus inclusions, were present in moderate numbers of cells. Ulcerated sites were covered by thick layers of degenerative neutrophils intermingled with necrotic cellular debris and mixed bacteria.

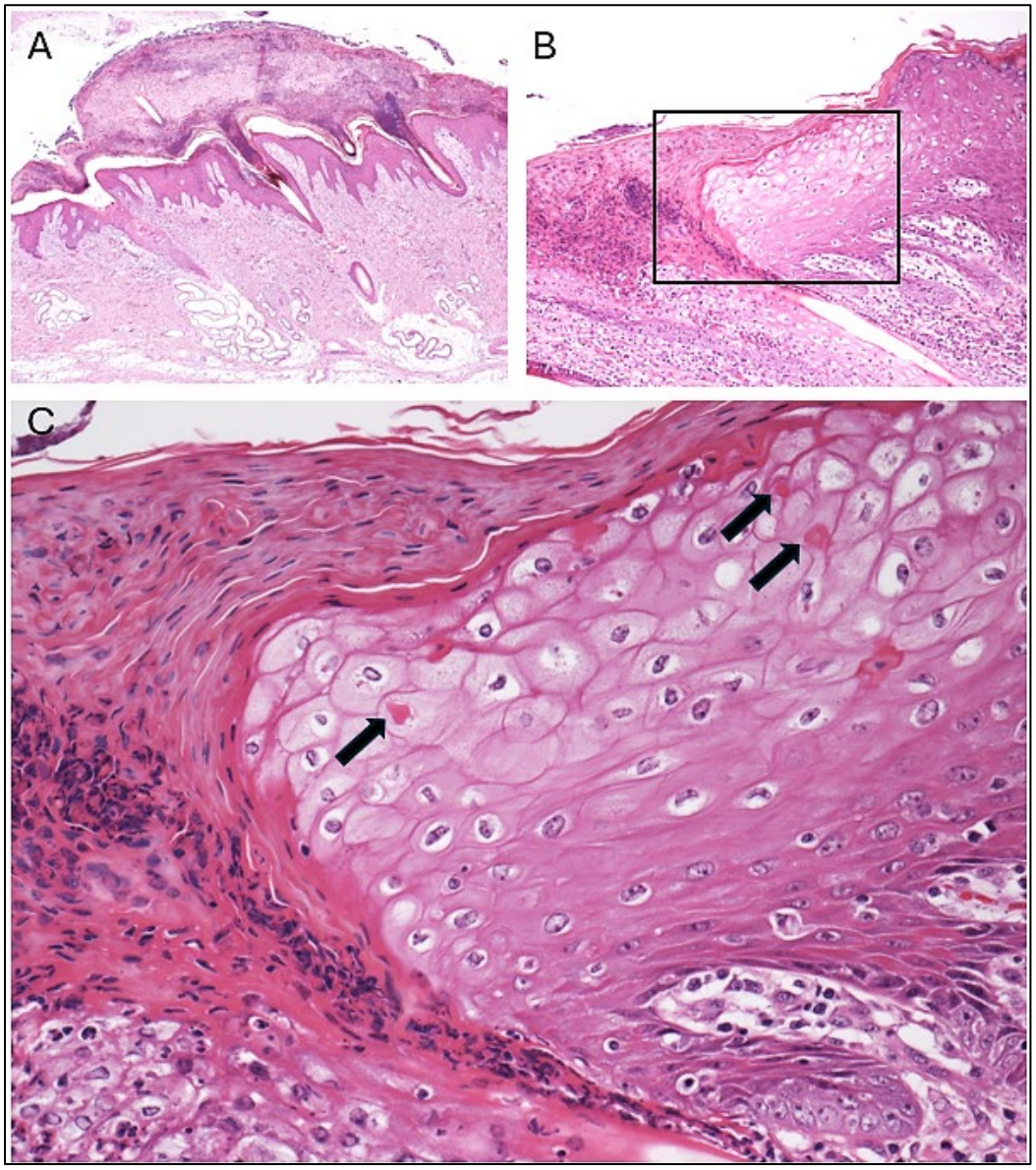

Figure 2. Histologic lesions of swinepox in haired skin from a neonatal piglet. (A) Discrete focus of epidermal hyperplasia covered by a thick cellular crust. (B) Epithelial cell swelling (hydropic degeneration) in epidermis at the periphery of the skin lesion. (C) Inset from panel B – Eosinophilic intracytoplasmic viral inclusions in swollen epithelial cells. H&E stain.

The gross and histologic features of the skin lesions in this piglet, and presence of intracytoplasmic inclusions in epithelial cells in association with the lesions, are consistent with poxvirus infection and a diagnosis of congenital swinepox. Swinepox virus can infect pigs of all ages, and lesions typically involve the entire body. Gross and histologic lesions, with evidence of intracytoplasmic inclusions consistent with poxvirus inclusions, are usually striking. Confirmatory tests for swinepox are not readily available, and the diagnosis relies on the combined presence of typical gross and histologic lesions, with evidence of viral inclusion bodies consistent with poxvirus inclusions, in the context of sporadic disease occurrence in the herd. Lesions are typically limited to skin and oral mucosa, without evidence of systemic disease. Follow-up information from the producer in this case indicated that the incidence of new cases was short-lived in the herd (self-limiting infection).

Pigs with swinepox are infrequently submitted to the AHL for postmortem examination, reflecting the very sporadic nature of the disease. Between January 2010 and November 2025, 4 cases of swinepox were diagnosed at the AHL. Most cases involved neonatal pigs (3 cases), and 1 case involved nursery pigs. For 1 of the cases with neonatal pigs, a sow with pox lesions was described clinically as the initial case in the herd, with lesions subsequently identified in a single, unrelated litter. Presence of skin lesions at birth (congenital infection) was confirmed in the clinical history for only 1 of the 3 piglet cases, although piglets in all cases were very young (1-3 days of age), supporting *in utero* infection with the virus.

Swinepox virus (SwPV) is the only member of the genus Suipoxvirus. The virus is antigenically distinct from other poxviruses, such as cowpox. Poxviruses are the only known family of DNA viruses that replicate and assemble in the cytoplasm of the host cell, rather than in the nucleus, resulting in the intracytoplasmic inclusion bodies seen in histologic samples. Insects can act as mechanical vectors for transmission of SwPV, including biting lice (*Haemotopinus suis*), and possibly including biting flies and mosquitoes. Horizontal transmission occurs by direct contact with skin lesions, and with oronasal secretory debris. Viral replication occurs in the epidermis, resulting in the lesions seen histologically (cell swelling, cytoplasmic viral inclusion bodies). Secondary opportunistic bacterial infection of skin lesions is common. Vertical transmission of SwPV also occurs, as in this case of congenital swinepox, and may be associated with sow viremia, although this pathogenesis has not been confirmed. Lesions of swinepox are usually present in only a few piglets in a litter. Abortion or stillbirth may also reportedly result from vertical transmission of SwPV, and severe oral lesions in neonates can negatively impact nursing and survival.

Important measures for the prevention of swinepox include parasite and environmental insect control, as well as management interventions to improve general hygiene in the environment. Immunosuppression due to a variety of infectious or non-infectious causes likely plays a role in increasing the susceptibility of some animals to infection with SwPV that may be present endemically in the herd.
While swinepox is a well-recognized condition, clinical disease is sporadic and infection is usually self-limiting, as in the sow herd in this case, and especially in older pigs. Swinepox is not a zoonotic disease, unlike some other poxviruses, and there is no associated public health risk. Consequently, the incidence and economic impact of swinepox are generally negligible in well managed herds. However, and importantly, swinepox must be differentiated from various vesicular diseases affecting swine, including Seneca Valley virus and reportable diseases (foot and mouth disease, vesicular stomatitis, swine vesicular

exanthema, swine vesicular disease). Other differential diagnoses include primary bacterial (streptococcal) dermatitis, erysipelas, classical swine fever, and pityriasis rosea. Epidemiologic features of these diseases in a herd would likely differ significantly from that seen with sporadic swinepox.

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The diagnosis of yellow fungus in bearded dragons

Emily Martin, Heindrich Snyman and Durda Slavic

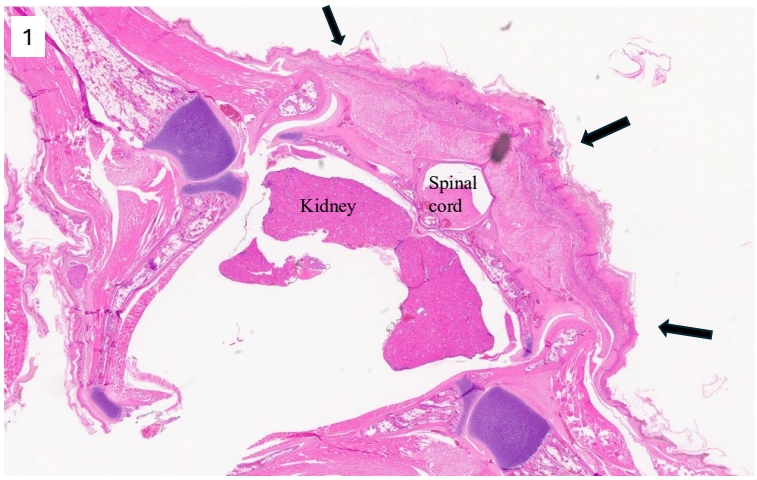
Animal Health Laboratory, University of Guelph, Guelph, ON.

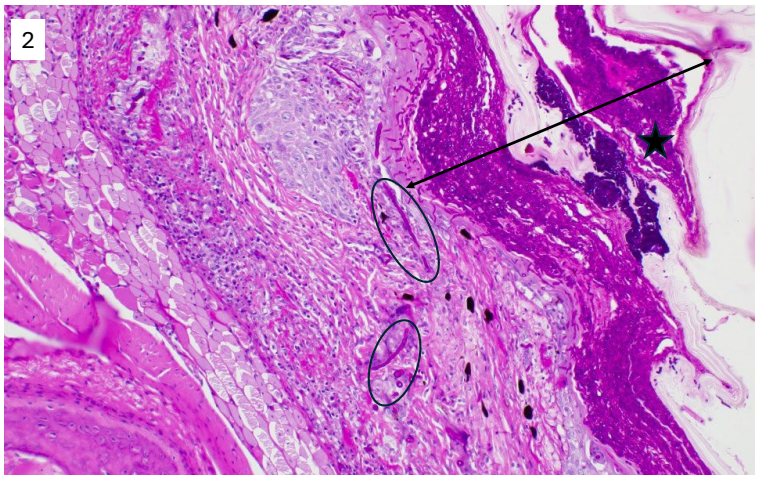
AHL Newsletter 2025;29(4):15

The disease commonly referred to as 'yellow fungus disease' in bearded dragons has had the classification of its causative agent evolve over time as further molecular techniques have been used for identification. Formerly classified as *Chrysosporium* anamorph of *Nannizziopsis vriesii* (CANV), we now know that fungi in this group now belong to the genera *Nannizziopsis*, *Paranannizziopsis* and *Ophidiomyces*. As these keratolytic fungal species are difficult to distinguish based on their morphology, AHL keeps reporting them as CANV complex. For further speciation of the CANV complex members, molecular techniques are required.

Nannizziopsis guarroi is considered the primary causative agent of yellow fungus disease in bearded dragons. The disease initially presents as yellow discolouration of the scales on various areas of the body, progressing to dark necrotic areas (**Fig. 1**). The infection progresses from superficial skin lesions to deep granulomatous dermatitis, potentially disseminating to multiple organs and resulting in death (**Fig. 2**).

Recently, AHL has received skin biopsies requesting screening for 'yellow fungus' without additional samples for mycology. In early clinical cases, it can be difficult to identify fungus in the superficial crusts or keratin layers of the skin samples, especially if sloughing has occurred during tissue collection, fixation or processing. Also, a special stain is often required to confirm the fungal structures on histology. Many other opportunistic fungal organisms can also colonize skin lesions (e.g., hyalohypho-mycotic fungi such as *Paecilomyces* sp., *Fusarium* sp., *Aspergillus* sp., *Penicillium* sp., etc.) and can further complicate the histological diagnosis of fungal skin disease in reptiles. For a complete diagnosis we recommend sending skin for both histology and mycology.





Histological changes associated with an inland bearded dragon (*Pogona vitticeps*) with yellow fungus disease. **Figure 1.** H&E-stained cross section of the rostral pelvic cavity and caudal body. The dorsal midline contains a large region of full thickness epidermal ulceration that is overlain by a thick surface crust of necrotic keratin debris (arrows). **Figure 2.** PAS-stained higher magnification of the ulcerated region and crust. The crust (double-headed arrow) is widely permeated by a dense mat of deep magenta hyaline fungal hyphae that extend into the exposed inflamed dermis (ovals). Abundant clusters of spores are present along the outer debris (star) which represent a significant source for environmental and fomite contamination and transmission.

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Pheohyphomycotic fungoma in the tail of a big-belly seahorse

Heindrich Snydman, Véronique LePage

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AHL Newsletter 2025;29(4):17.

A single 7 year-old female big-belly seahorse (*Hippocampus abdominalis*) (**Fig. 1**) died following a 2-day period of anorexia. An in-clinic postmortem exam was conducted, and the only obvious gross finding was that of regional subcuticular swelling along the ventral peduncular base of the tail just caudal to the anal pore (**Fig. 2A, 2B)**. A small overlying defect was present along the region of swelling with the underlying dermal tissue being discoloured dark grey-black. Light digital compression of the site resulted in protrusion of this dermal tissue through the defect as multiple, contiguous, firm, dark grey-black nodular masses. Neoplasia was considered at this time, and the extruded masses were fixed in 10% neutral buffered formalin and submitted to the Animal Health Laboratory for further histological analysis.

On histological examination, the sampled masses all appeared identical, being composed of numerous individual and occasionally coalescing dense clumps of fine granular eosinophilic debris that were widely permeated by a dense mats of intertwined dark yellow-brown pigmented fungal hyphae with moderate numbers of infiltrating macrophages and fewer neutrophils (**Fig. 3A, 3B)**. Hyphae were slender in morphology, measuring ~ 1.5-2.0 µm wide with parallel sides, regular septation and occasional dichotomous branching. A histological diagnosis of fungal hyphal mats with associated necrotic debris and macrophage infiltration was made with the localized nodular presentation being consistent with a so-called fungoma. The darkly pigmented characteristics of the hyphae were further consistent with a fungal infection caused by a dematiaceous fungus (phaeohyphomycosis).

Pigmented fungal hyphae are common in the environment and infection in fish is usually associated with some or other predisposing condition (e.g., regional trauma/penetrating injuries, other infections, or immunocompromised state). In this case, it is possible that a primary ulcerative skin lesion, e.g., along the tail, may have acted as an initiating cause for the observed pigmented fungal infection. This is particularly significant in this case, as the tail plays an important role in prehension in sygnathids, and as such, can often be exposed to excessive abrasive injury from environmental substrates.

Exophiala sp. probably represents the most common pigmented fungus isolated in fish, but various species can be implicated. This has become particularly important in aquaculture-reared cleaner lumpfish with four main species being identified - *E. angulospora, E. psychrophile, E. salmonis,* and *E. aquamarina*. Cultures were not performed on the current case, but various *Exophiala* sp., as well as *Cyphellophora olivacea* (syn. *Phialophora olivacea*) have been identified in other fish cases submitted to the lab.

Figure 1. Adult big-belly seahorse (*Hippocampus abdominalis*) in holding tank.

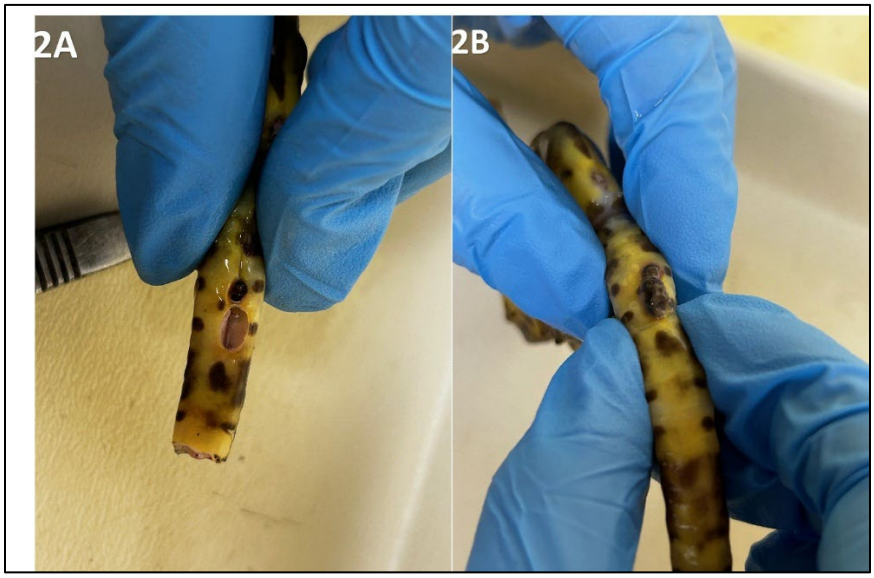

Figure 2. Postmortem findings in a captive big-belly seahorse with tail swelling. **A.** There is a regional defect within the ventral surface of the tail base with protruding dark grey-black pigmented dermal tissue. **B.** Gentle digital pressure results in protrusion of the masses through the opening.

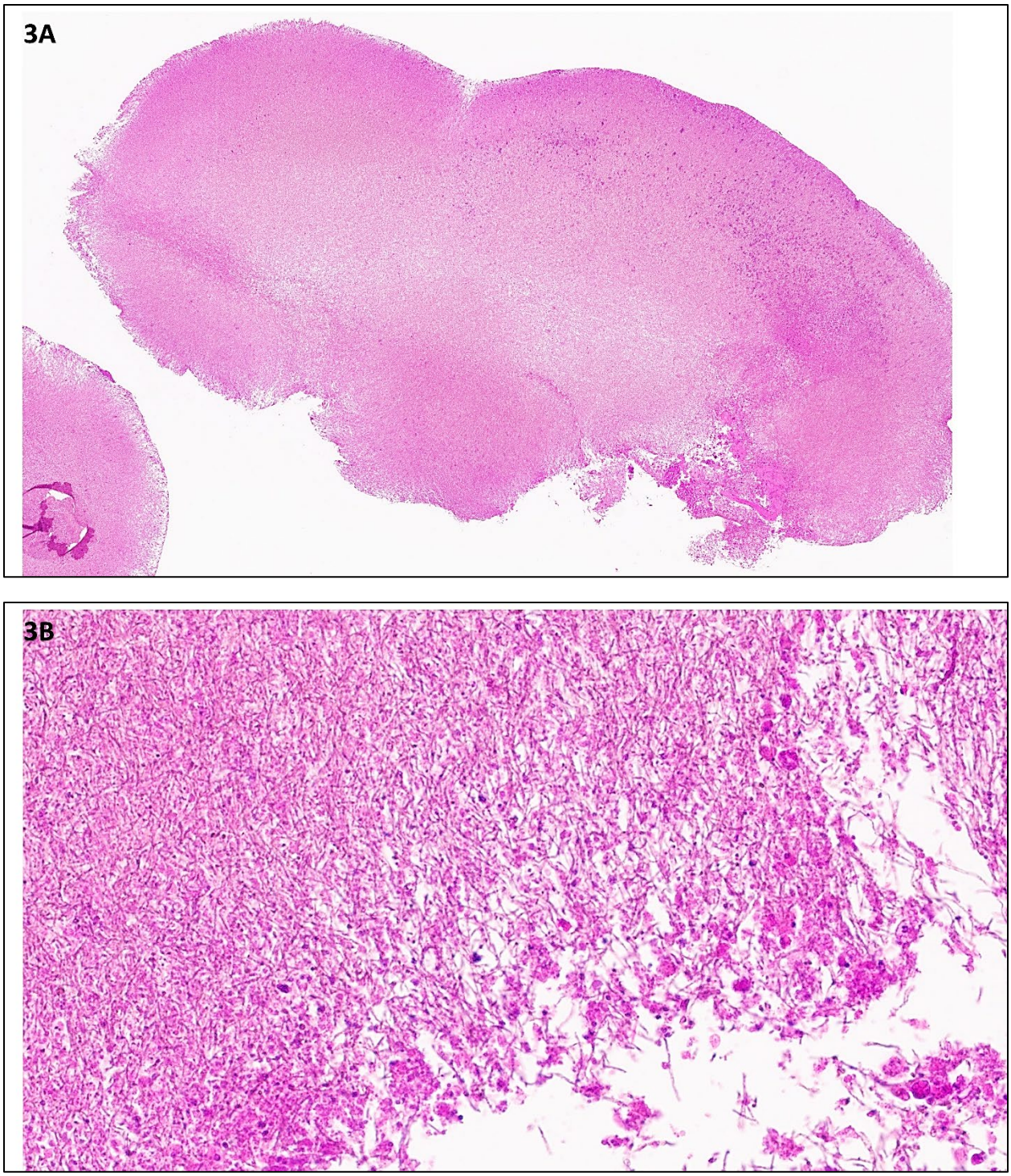

Figure 3. Histological findings of extruded tail base nodules in a captive big-belly seahorse. **A.** Nodules are composed of numerous individual and occasionally coalescing indiscriminate dense clumps of fine granular eosinophilic debris. **B.** Clumps were widely permeated by a dense mats of intertwined dark yellow-brown pigmented fungal hyphae with associated infiltrating macrophages and neutrophils.

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Vascular amyloidosis in a Northern Saw-whet owl

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AHL Newsletter 2025;29(4):20.

An 11-year-old Northern Saw-whet owl which had lived as a resident of a rescue organization was found deceased in its enclosure without premonitory signs. The animal had a history of arthritic change in several joints and bilateral cataracts, but was otherwise doing well. On gross examination, the coelom was noted to be mildly distended and contained clear, brown fluid. There was abundant fibrinous material over the surface of the liver. Histologically this correlated to a chronic perihepatitis. On histologic examination, it was also noted that the walls of numerous vessels, in particular the myocardium, had partial to circumferential thickening and distortion of the tunica media by the deposition of abundant acellular, brightly eosinophilic material (**Fig. 1**). Similar material was also found in the parenchyma of the spleen and the liver. This material-stained orange/red with Congo red special histologic stain, with bright green birefringence under polarized light (**Fig. 2**). This staining pattern is diagnostic for amyloid deposition, and confirmed amyloidosis in this owl.

Amyloidosis is a heterogenous disease which can be congenital or acquired, and occurs when precursor amyloid proteins are misfolded and become insoluble; these fibrillar proteins are then deposited within tissues of the body. The exact reasons why this misfolding occurs are varied and complex; however, mutations, changes in post-translational modification of proteins, and the presence of free radicals have all been implicated. In animals, the most common form is an acquired form known as reactive amyloidosis. The most common precursor protein associated with this form is serum amyloid A, which is an acute phase protein produced during active inflammation. Secondary or reactive amyloidosis is well described in various types of birds, especially in waterfowl secondary to chronic pododermatitis. Any chronic or repeated inflammatory stimulus can potentially trigger reactive amyloidosis. In this animal, the chronic perihepatitis is a possible trigger for the development of this disease. There is evidence that this condition can be horizontally transmissible in avian species, and potentially between different species, although specific evidence regarding owls is lacking.

Deposition of amyloid can occur in various tissues, and this can lead to remarkably variable disease presentation depending on the tissues affected, making diagnosis of this condition more challenging. The liver, kidney, spleen, and blood vessels are common sites for deposition. In this case, the blood vessels were the most prominent site of deposition, with involvement of the liver and spleen as well. Given the extent of involvement of the cardiac vasculature and the pulmonary trunk, a cardiac event secondary to narrowing and distortion of these essential vessels was considered the most likely cause of acute death in this case.

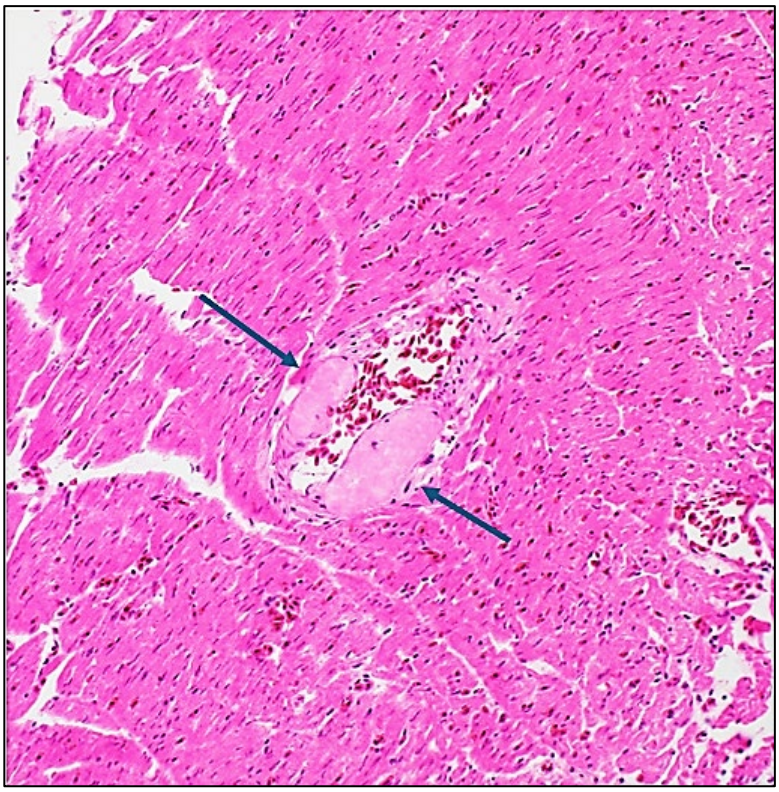

Figure 1: A myocardial vessel with multifocal distortion and thickening of the wall by brightly eosinophilic (pink) deposition of amyloid (arrows). H&E stain, 20x.

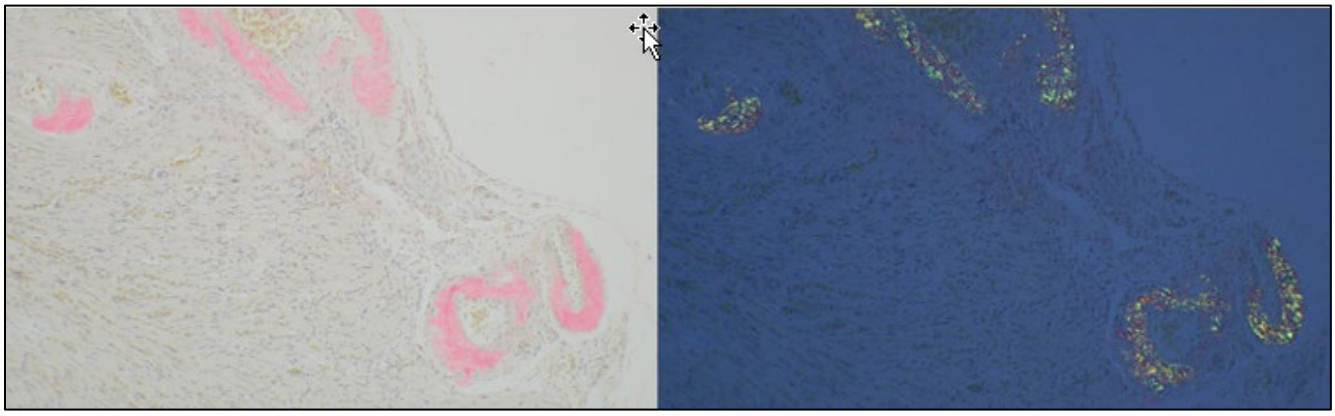

Figure 2: Section of the heart showing multiple vessels with abundant amyloid deposition, which appears bright red with Congo red stain (left). This same material has bright green birefringence under polarized light (right). This pattern is confirmatory for amyloid in histologic section. Congo red stain, 20x.

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Keeping Ontario's Hatchery Fish Healthy: 2022–2025 Monitoring Program

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AHL Newsletter 2025;29(4):22.

Supporting Ontario's Fisheries and Biodiversity

Ontario's fish culture and stocking program is a cornerstone of the province's recreational fishing and biodiversity restoration efforts. Each year, 9 fish culture stations (3 of which also have separate sub-stations) raise and release more than 6.5million fish into over 1,200 lakes and rivers, sustaining a vibrant recreational fishery enjoyed by 1.2 million anglers and contributing $1.7 billion annually to the provincial economy.

To ensure the health of these stocked fish—and to protect wild populations—the Ontario Ministry of Natural Resources (MNR) partnered with the University of Guelph's Animal Health Laboratory (AHL) to conduct a comprehensive fish health monitoring program from 2022 to 2025.

Comprehensive Testing and Strong Results

Over the three-year monitoring period, 6,930 fish from multiple species - including Atlantic salmon, brook trout, brown trout, chinook salmon, lake trout, rainbow trout, splake, lake whitefish, and walleye - were sampled across MNR facilities.

In total, 16,162 tests were conducted, including:

- 9,512 PCR tests,
- 4,923 bacterial cultures,
- numerous necropsy and histopathology assessments.

Results revealed very low pathogen detection rates, with only 0.9% of PCR tests returning positive results. Importantly, no detections were made for key notifiable viral pathogens such as IHNV, ISAV, IPNV, VHSV, or the parasite *Myxobolus cerebralis* (whirling disease agent).

Bacterial culture results were also encouraging; 87% of fish samples showed no bacterial growth or only growth of non-pathogenic species.

Effective Biosecurity and Ongoing Vigilance

These findings highlight the effectiveness of MNR's biosecurity, surveillance, and health management programs in maintaining healthy hatchery populations. The low rate of pathogen detection and absence of major reportable diseases demonstrate that current fish health safeguards are working as intended.

Ongoing monitoring remains vital to:

- safeguard fish health,
- prevent potential disease outbreaks,
- support biodiversity restoration and sustainable recreational fishing across Ontario.

Acknowledgements

The project team extends sincere thanks to the MNR hatchery staff and field biologists for their commitment and expertise, and to the AHL Specimen Reception staff for their assistance.

HORSES

Equine ocular habronemiasis

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AHL Newsletter 2025;29(4):24

A sore developing at the medial canthus of a horse's eye was biopsied. Histopathology identified multiple cross sections of poorly preserved nematodes in the necrotic tissue of the sore (**Fig 1.**), consistent with *Habronema* sp. spirurid worms, leading to a diagnosis of ocular habronemiasis.

In this parasitic disease, the nematode is spread fecal-orally through a fly intermediate host which deposits larvae at the oral mucous membranes so that swallowed larva may grow to maturity in the stomach. However, sites of predilection for aberrant larva deposition include any moist area of skin, including the medial canthus of the eye, the penis, and cutaneous wounds. The result is a robust granulomatous and eosinophilic inflammatory response, necrosis, and a sore to nodular and pruritic lesion of granulation tissue at the affected area. Mineralized to caseous white/yellow foci are often appreciable on cut section of the lesion. Due to the need for a fly intermediate host, the lesions tend to be seasonal (summer sores) and fly control methods, insecticides, dewormers and fly masks are among the useful preventatives. Debulking of the granulation tissue, and topical ivermectin and glucocorticoids may be used as therapy, although in some cases there can be prolonged healing.

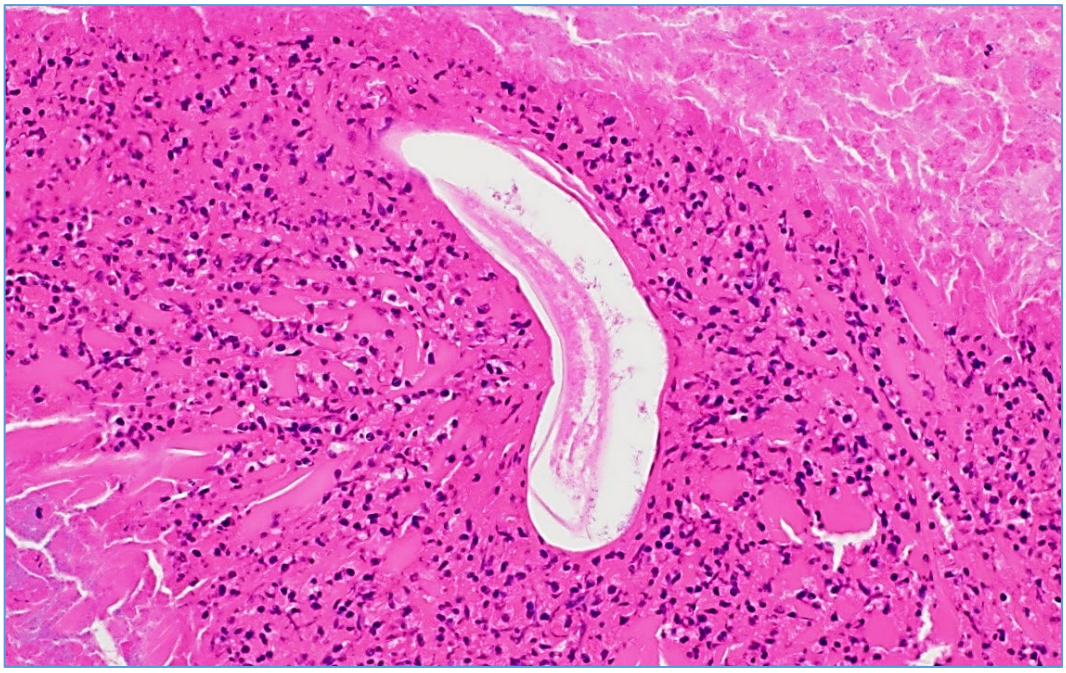

Figure 1. Equine, conjunctiva. The necrotic remnants of an elongate spirurid nematode. H&E stain

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Alcohol and Gaming Commission of Ontario (AGCO) Death Registry / Equine Incidences in Ontario Racing program: 2024 Postmortem Summary

The Alcohol and Gaming Commission of Ontario (AGCO; formerly the Ontario Racing Commission, ORC) continues in its **proactive approach to advance racehorse welfare and safety of human and animal participants**. 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 knowledge of why these events occur. Postmortem (PM) exams conducted at the Animal Health Laboratory (AHL) through the AGCO Death Registry (DR, 2003-2016) and Equine Incidences in Ontario Racing (EIOR, 2016-current) programs continue to provide comprehensive data regarding the causes of morbidity and mortality in racehorses in this province.

The 2024 racing season marks the 23rd year of the PM program. As of December 31, 2024, PM has been carried out on 1,416 horses, including 661 (47%) Standardbreds, 721 (51%) Thoroughbreds, and 34 (2%) Quarter Horses (**Fig.1**). Annual variation in the number of PM cases reflects the discretionary requirement for PM of reported deaths on the part of the Registrar of AGCO.

A summary of diagnoses by body system for 2024 AGCO PM cases is provided in (**Fig. 2**).

Since 2015, **computed tomography (CT) of fractured and contralateral limbs** has been performed on select AGCO postmortem cases through collaboration with the Diagnostic Imaging section of the Ontario Veterinary College Health Sciences Center. The goal of this in-depth examination is to identify pre-existent lesions, primarily in bone, that contribute to catastrophic fractures. In 2024, CT imaging was carried out on 39 limb fracture cases submitted for PM. **Pre-existent lesions in bone were identified by CT and considered potentially predisposing to fracture in 22/39 (56%) cases.**

Exercise-associated sudden death continues to be of concern to the racing industry. At the AHL, an in-depth PM protocol is used in the evaluation of these cases, with special emphasis on cardiovascular and respiratory systems. In 2024, the cause of death (COD) was investigated in 8/68 (12%) horses that died during or shortly after exercising (**Fig. 3**). Death was attributed to significant acute pulmonary hemorrhage compatible with the syndrome of equine exercise-associated fatal pulmonary hemorrhage (EAFPH) in 3 horses; significant hemorrhage at other anatomic sites in 3 horses (aortic rupture and hemothorax -1 horse; hemoperitoneum -1 horse; dissecting subaortic hemorrhage – 1 horse); and to pericarditis and myocarditis in 1 horse. The COD was undetermined in 1 horse. Over the duration of the postmortem program (2003-2024), the COD was undetermined in 54/226 (24%) sudden death cases. It has been speculated that **exercise-associated cardiac dysrhythmia**, leading to acute heart failure and pulmonary hypertension, may be the underlying cause of death among many of these horses, and may also contribute to pulmonary hemorrhage. Typically, no morphologic lesions are detected in heart to

explain the cause of speculative fatal ventricular dysrhythmia, and the diagnosis cannot be confirmed based on PM findings.

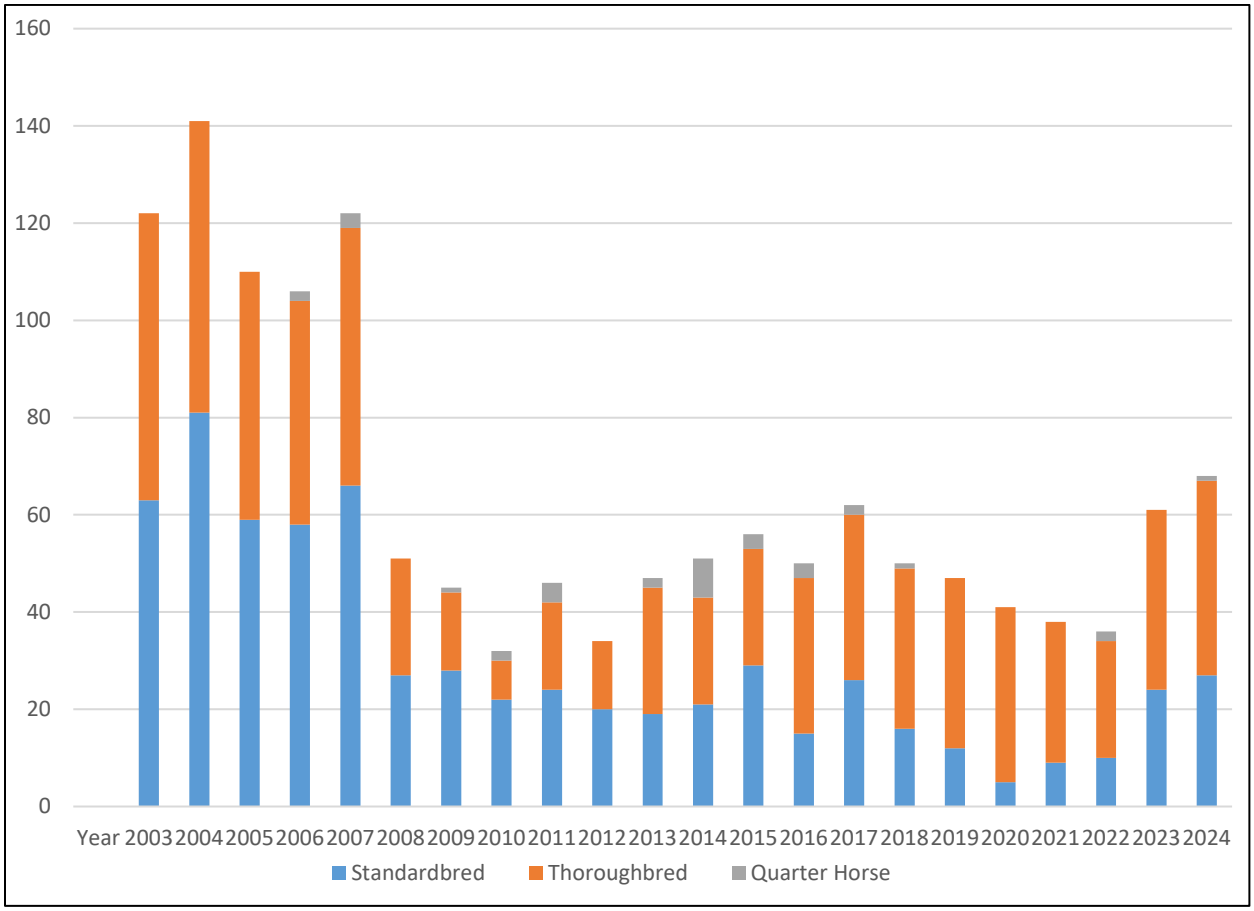

Figure 1. Breed distribution of AGCO postmortem submissions to the AHL, 2003-2024.

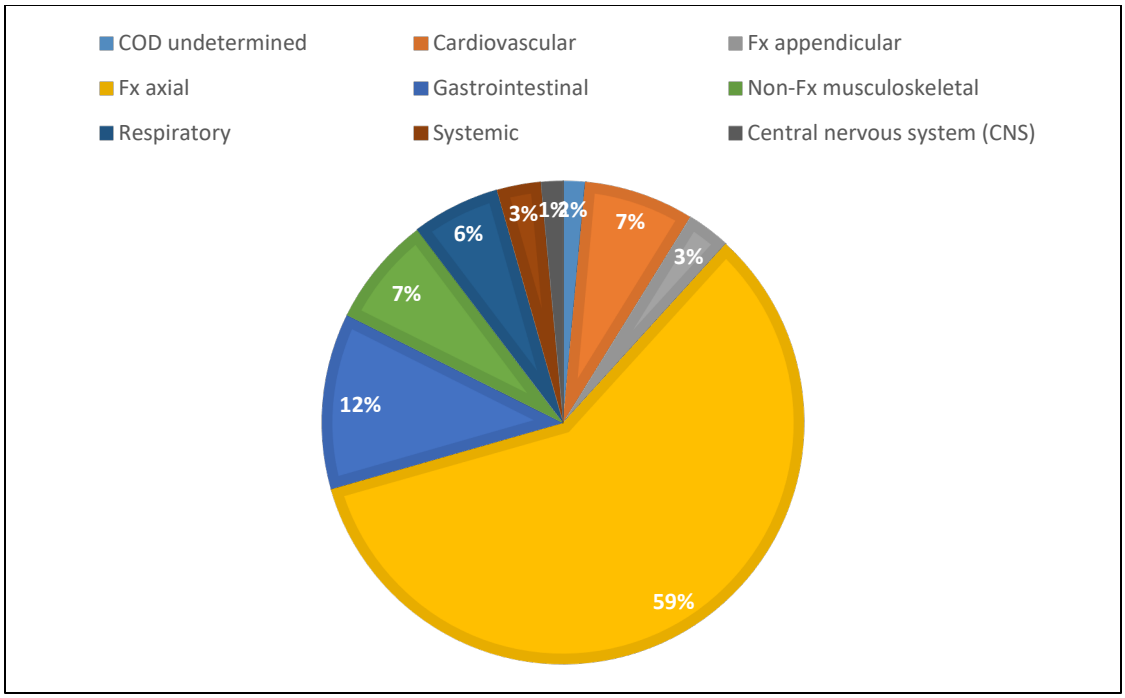

Figure 2. Diagnoses by body system for AGCO postmortem submissions to the AHL, 2024.

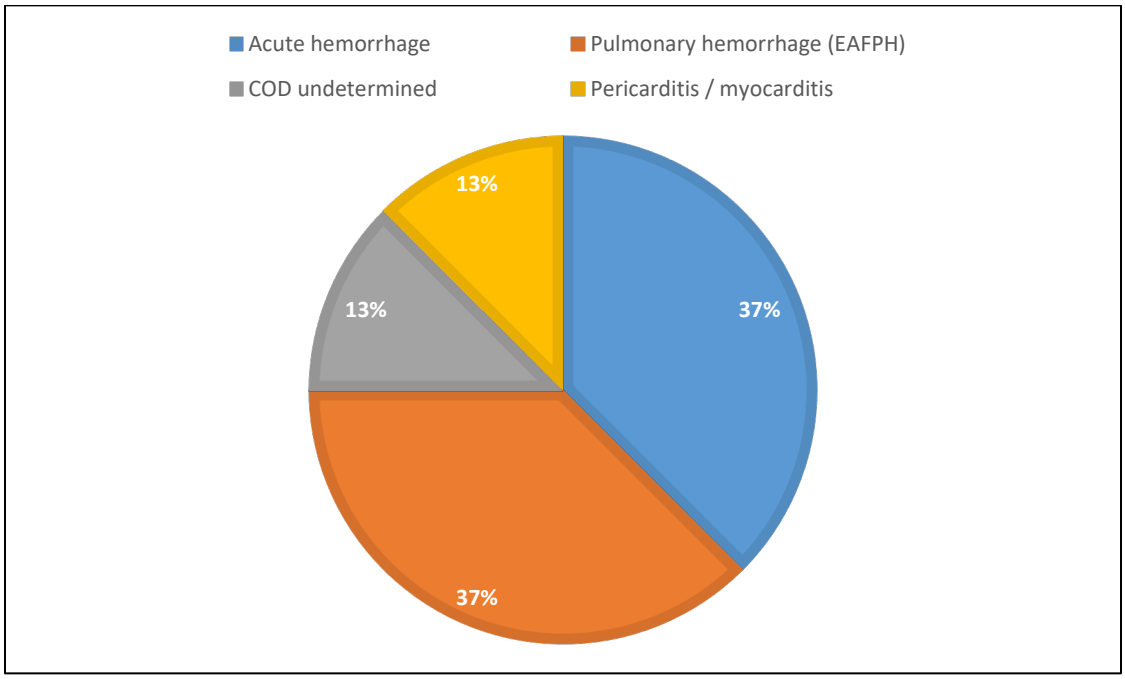

Figure 3. Diagnoses by body system for AGCO exercise-associated sudden death cases submitted to the AHL, 2024.

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Saint Bernard dermal proliferative arteritis of the nasal philtrum

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AHL Newsletter 2025;29(4):29.

Biopsies from a 6-year-old male neutered Saint Bernard dog with greater than a year long history of nasal philtrum epithelial depigmentation and recent recurrent bleeding were submitted to the AHL for histopathology.

Microscopic examination highlighted luminal narrowing of several mid- to deep-dermal arteries and arterioles with marked thickening of the intima by fibrillar eosinophilic to basophilic material and spindle cells, and highly irregular internal elastic laminae (**Figs. 2a, 2b**). Several hemosiderin-laden macrophages (suggestive of previous hemorrhage) were scattered throughout the superficial dermis and surrounded affected vasculature.

Proliferative arteritis of the nasal philtrum has classic presenting features that have been recognized in dogs. Published cases most commonly include Saint Bernards; however, it has also been reported in giant schnauzers, bassett hounds, doberman pinschers, Labrador retrievers, Newfoundland dogs, Samoyeds and mixed-breed dogs. Original reports in Saint Bernards included genetically-related dogs, suggesting a potential genetic breed predilection. Age of onset ranges from 2 – 6 years of age. Gross lesions are limited to the nasal philtrum - the rest of the nares are spared - and include non-pruritic and non-painful, well-demarcated linear to oval shaped ulceration of the nasal philtrum with episodes of mild to profuse hemorrhage (**Fig.1**).

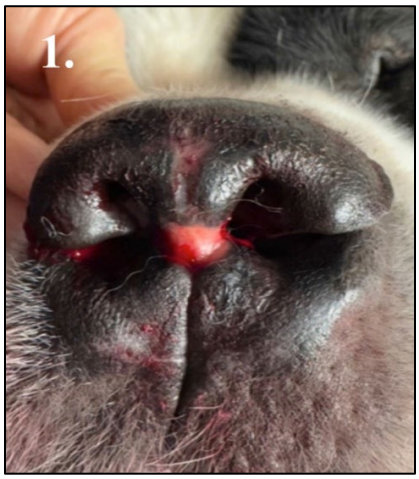

Figure 1. Gross lesions of *Proliferative arteritis of the nasal philtrum* in a 6-year-old Saint Bernard dog. Distinct focal linear ulceration of the nasal philtrum parallel to the lip margin with surrounding hemorrhage.

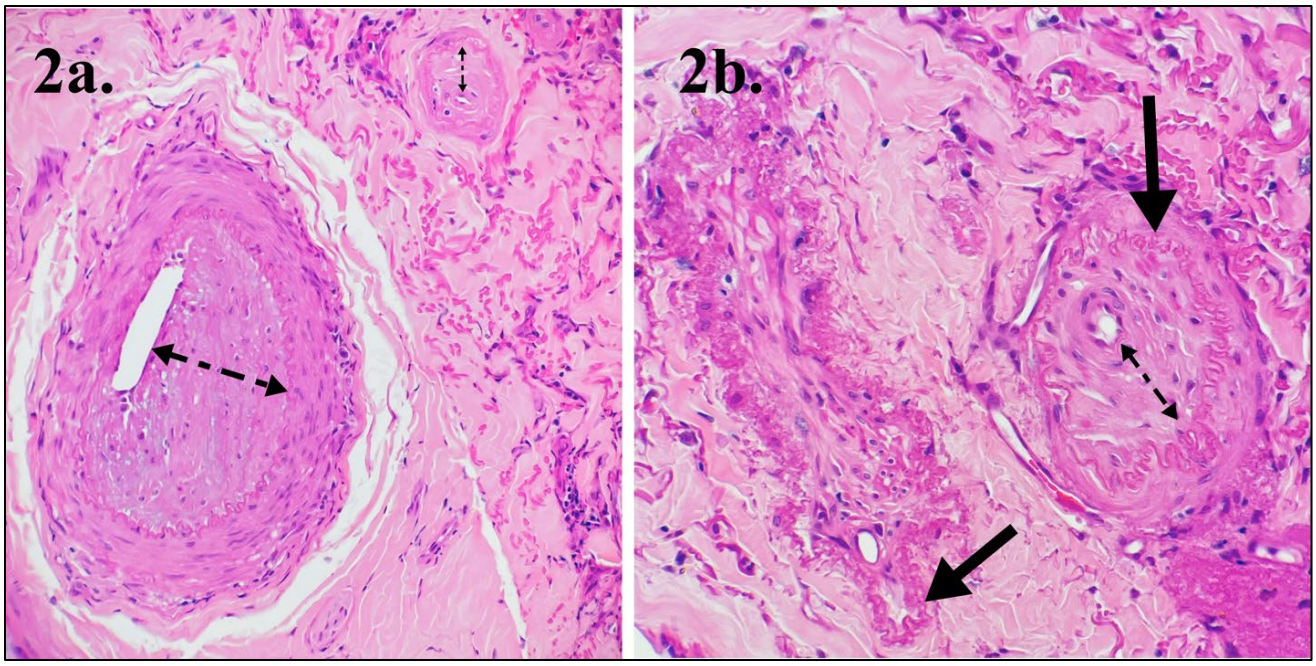

Figure 2. Histologic features of proliferative arteritis of the dermal arteries/arterioles of the nasal philtrum. **a.** Marked narrowing of the lumen and thickening of the wall of dermal arteries and arterioles with matrix deposition in the tunica intima and subendothelial spindle cell proliferation (dashed arrows) 20x. **b.** Highly irregular undulating internal elastic lamina (solid arrows) 20x. H&E stain.

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Feline pseudomycetoma; an uncommon presentation of *Microsporum canis* infection in cats

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A female spayed, 12-year-old Persian cat had a history of slowly expanding round dermal masses that had been present and visible to the owner for a period of 1-2 years. The rate of growth was slow, though ulceration of the skin overlying the two masses was observed, leading to their removal. Both tissues (haired skin samples) were submitted as biopsies at the Animal Health Laboratory. On tissue sectioning, the nodules contained yellow granular purulent material.

Histologic examination revealed ~1.1 cm x 2.0 cm to 1.2 cm x 3.3 cm ulcerated masses expanding and effacing the dermis. These were comprised of sheets of epithelioid macrophages and multinucleated giant cells, admixed with viable and degenerate neutrophils (**Fig. 1**). These sheets of inflammatory cells were centred around radiating Splendore-Hoeppli material, and oval to polyhedral granular structures that in some areas appeared to form ovoid to elongated fungal spores or hyphal masses (**Fig. 2**). Both masses were confirmed to be inflammatory reactions to fungal elements as opposed to neoplasia. These histological features are consistent with a diagnosis of dermatophytic pseudomycetoma.

Dermatophytic pseudomycetomas with subsequent pyogranulomatous reaction are a rarely-reported invasive fungal infection, that have been observed in humans and animals - felines in particular. In cats, this is typically a rare presentation of a *Microsoporum canis* infection. While feline dermatophytosis due to infection with *M. canis* is common, mycetoma formation is not. Typical *M. canis* infections are non-invasive, with restriction of the fungal elements to colonized surface skin. When involvement of the deeper tissues occurs, an inflammatory mass can result. Interestingly, mycetoma formation is almost exclusively reported in Persian cats. While the underlying cause of this reported increased incidence is uncertain, an inherited susceptibility is suspected.

Dermatophytic pseudomycetomas typically form nodular, non-painful, non-pruritic firm masses, usually located on the trunk, flanks or tail; concurrent superficial dermatophytosis is common. These masses can ulcerate and occasionally, infections can form a fistula with exudation of the purulent and fungal material to the exterior surface of the skin. Occasionally, the fungal elements in these dermal masses can invade the deeper subcutis, complicating both treatment and possible surgical resection.

As *M. canis* is a zoonotic pathogen, awareness of the possible different presentations possible for infection with this fungal species is useful, especially in clinical practice.

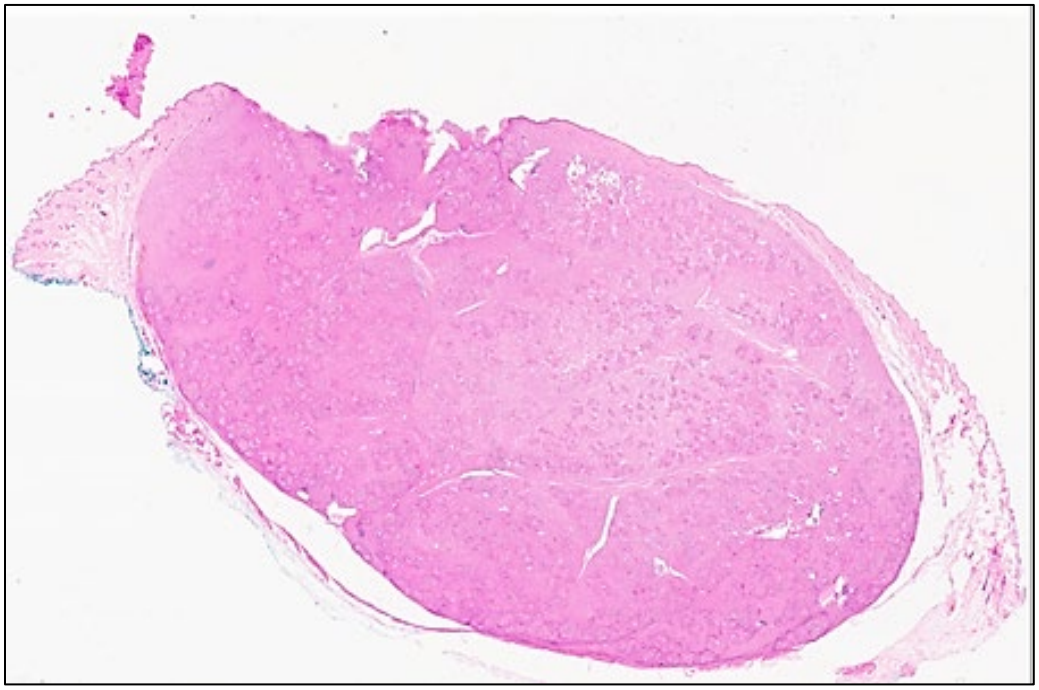

Figure 1. Skin from a 12-year-old cat; there is a focal mass of inflammatory cells elevating the partially ulcerated skin surface (2x). H&E stain.

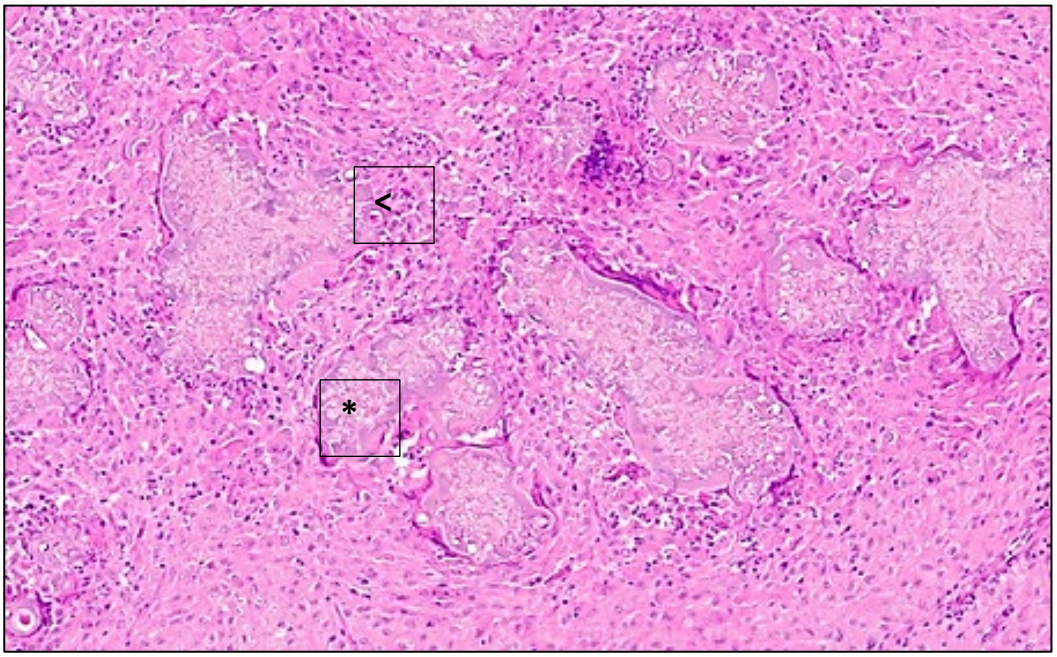

Figure 2. Skin from a 12-year-old cat. Multinucleated giant cells, macrophages and degenerate neutrophils are centered on Splendore Hoeppli material (<) surrounding fungal elements (*). 20x. H&E stain.

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Infiltrative lipoma: An entity to keep in mind

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AHL Newsletter 2025;29(4):32

A 7-year-old male neutered Great Pyrenees dog presented to a referral veterinary center for recurrent growth of a mass associated with the left body wall following removal by his primary care veterinarian several months prior. CT imaging was performed and revealed a fatty mass with evidence of invasion between muscle layers of the body wall. A second surgery to remove this large mass was performed, and the specimen was sent to the Animal Health Laboratory for gross examination, sampling and fixation, and histopathology. The mass was 36 cm x 21 cm x 12 cm and was comprised of fatty tissue that infiltrated

between a few slender pieces of muscle at the periphery and extended widely across surgical margins (**Fig. 1**).

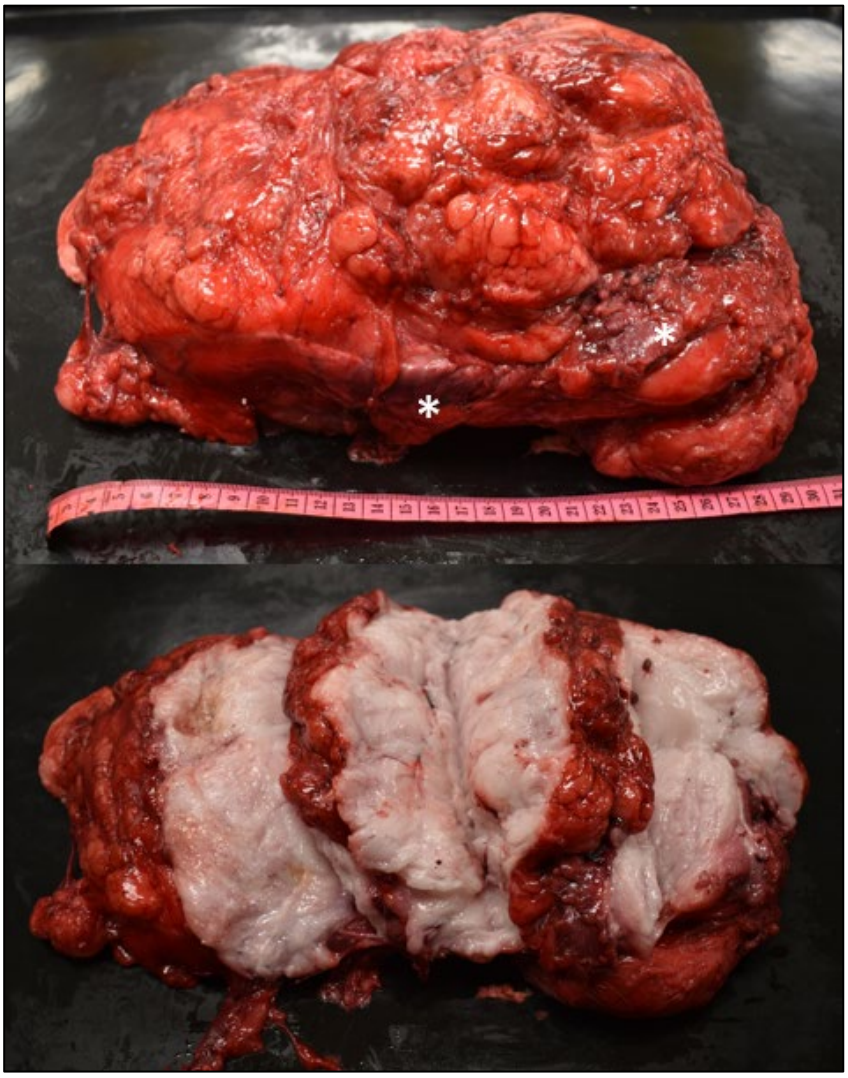

Figure 1. Photograph of the 36 x 21 x 12 cm lipoma excised from the left body wall of a dog during gross examination and sample collection at the Animal Health Laboratory. Note the presence of a few slender pieces of striated muscle at the periphery (*).

Microscopic examination of several formalin-fixed paraffin-embedded samples from the mass confirmed that it was composed of adipose tissue formed by sheets of well-differentiated neoplastic adipocytes, among which there were a few thin fibrous septa and occasional small groups of blood vessels. In one piece, the adipose tissue was intimately associated with a few bundles of striated muscle at the periphery. There was also adipose tissue bordering both sides of a 10 mm long by 500 um thick band of fibrous tissue that contained multiple bundles of collagenous stroma harbouring widely-spaced wavy fibrocyte nuclei (reminiscent of ligament or epimysium).

In this case, the clinical history and histopathology results confirmed a diagnosis of infiltrative lipoma. Lipomas are typically slow-growing and expansile tumors that are cured by excision, but infiltrative lipomas can be more difficult to completely excise and may require repeated surgical resections. Over the last 10 years at the Animal Health Laboratory, 8-9% of lipomas in both dogs and cats have been diagnosed as infiltrative (**Table 1**). The diagnosis of infiltrative lipoma is made based on invasive nature and tumor recurrence, not by the bland appearance of the adipocytes histologically; thus, the diagnosis hinges upon a clinical description of these features from the submitting veterinarian.

Table 1. Lipoma diagnoses in dogs and cats at the Animal Health Laboratory from 2015-2025

Species	Lipoma	Infiltrative Lipoma
Canine	826	68
Feline	45	4

Reference

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