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Staff Spotlight

A newsletter about diagnostic trends at the laboratory, animal health topics, interesting cases and new test offerings.

[www.vdl.ndsu.edu](http://www.vdl.ndsu.edu)

We welcome comments, questions and suggestions. Please email us at [vetlab.ndsu@ndsu.edu](mailto:vetlab.ndsu@ndsu.edu) or call the laboratory at (701) 231-8307.

# NDSU Veterinary Diagnostic Laboratory

## Note From the Editor

Welcome spring!

Despite a few recent cold spells, spring finally has sprung.

As the North Dakota region is in the midst of calving season, case submissions naturally have risen. Like for many of you, the current COVID-19 pandemic has changed the way we do things around here. But rest assured, the VDL pathologists, technicians and administrators are hard at work to get accurate and timely results to regional veterinarians, producers, pet owners and public health officials.

For this season's newsletter, I wanted to point out two sections we have added – *Staff Spotlight* and *Dr. Rice's Mystery Photo*. Be sure to check them out and visit the VDL website to find the answer to Dr. Rice's case. Dr. Webb's Director's Corner will return in the next newsletter.

Thanks, and enjoy the rest of the spring blossoms while they last.

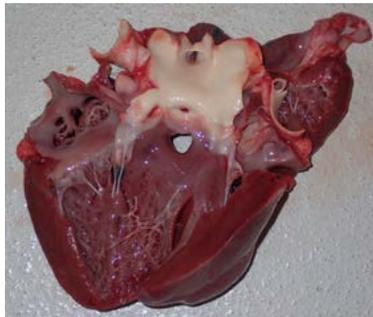
**Heidi Lee Pecoraro**, DVM, PhD, Diplomate, ACVP  
Veterinary Pathologist

## Calendar: Summer Closures

July 3 – Independence Day observed

September 7 – Labor Day

## Dr. Rice's Mystery Photo



Dr. Laura Rice, the VDL's newest pathologist, takes amazing photographs on the autopsy floor. We thought we would highlight one image per issue of some of the interesting cases she has seen since she started.

The photo is from the gross examination of a 3-month-old male Boer goat that was found dead with no prior clinical signs. Visit the VDL Website ([www.vdl.ndsu.edu](http://www.vdl.ndsu.edu)) to find out the diagnosis.

**NDSU** VETERINARY DIAGNOSTIC  
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## Bench Notes

**NAHLN:** The NDSU VDL is a part of the **National Animal Health Laboratory Network (NAHLN)**. From the U.S. Department of Agriculture (USDA) website ([www.aphis.usda.gov/aphis/ourfocus/animalhealth/lab-info-services/nahln/ct\\_national\\_animal\\_health\\_laboratory\\_network](http://www.aphis.usda.gov/aphis/ourfocus/animalhealth/lab-info-services/nahln/ct_national_animal_health_laboratory_network)), the mission of NAHLN labs are to “provide animal health diagnostic testing, methods research and development, and expertise for education and extension to detect biological threats to the nation’s animal agriculture, thus protecting animal health, public health, and the nation’s food supply.”

As such, the VDL is capable of testing for **foreign animal diseases (FADs)** such as classical swine fever, African swine fever, foot and mouth disease, highly pathogenic avian influenza virus and Virulent Newcastle Disease (avian paramyxovirus-1). In addition, our Biosecurity Level-3 laboratory is primed to screen for **select agents** such as anthrax, plague and tularemia. As always, if any of these diseases are suspected, please contact the state veterinarians (main office phone is 701-328-2655) and/or the VDL before submitting samples.

**COVID-19:** As recently reported in the news media, a few cases of cats and dogs have tested positive by PCR assay for SARS-CoV-2, the causative agent of **COVID-19 disease**. The current USDA recommendation is to work with local, state and federal public and animal health officials to determine whether testing is appropriate for animals that are exhibiting respiratory signs (for more information visit [www.vdl.ndsu.edu/wp-content/uploads/2020/04/USDA-faq-on-companion-animal-testing.pdf](http://www.vdl.ndsu.edu/wp-content/uploads/2020/04/USDA-faq-on-companion-animal-testing.pdf)).

Any testing of North Dakota animals for SARS-CoV-2 must be treated like a **foreign animal disease** and the state veterinarians need to be contacted (main office phone is 701-328-2655). State veterinarian-approved samples that are submitted to the VDL for COVID-19 testing will be referred directly to the National Veterinary Services Laboratories (NVSL) in Ames, Iowa.

**RABIES: For all neurologic cases**, please submit **whole fresh brain**. Not only are full cross sections of unfixed brain necessary to rule out the rabies virus, but other infectious or neoplastic diseases may be detected by comparing both hemispheres. Please remember: **When diagnosis of CNS disease is the goal, keep the brain fresh and whole!**

## Disease Updates

We are well under way into the spring calving season. Fetal abortions are waning, while calf scours are a large portion of recently submitted cases.

Since February, the VDL has moved to PCR assay for bovine enteric coronavirus, rotavirus and *Cryptosporidium* spp. testing. Bacterial cultures are used to detect *Escherichia coli* and *Salmonella* spp. Fecal floatation is helpful in identifying parasitic infections such as coccidiosis (*Eimeria* spp.).

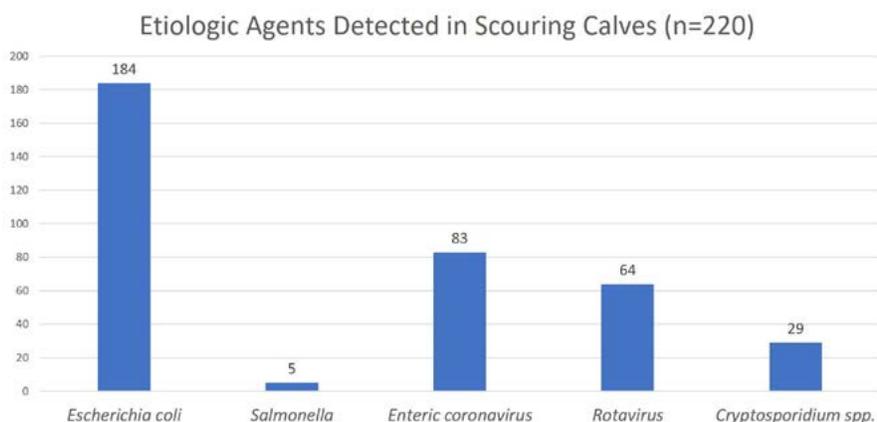
Based on bovine calf diarrhea PCR and enteric panels performed, more than 200 scours samples have been submitted since January of this year. Of those, *Escherichia coli* is the most frequent etiologic agent detected, followed by enteric coronavirus, rotavirus, *Cryptosporidium* spp. (most likely *C. parvum*) and, finally, *Salmonella* (Figure 1a).

Because *E. coli* is common in intestinal and fecal samples of healthy and sick animals, PCR assay to determine virulence factors often is performed in samples from neonatal calves under 2 weeks of age. Figure 1b breaks down the *E. coli* virulence factors amplified by PCR.

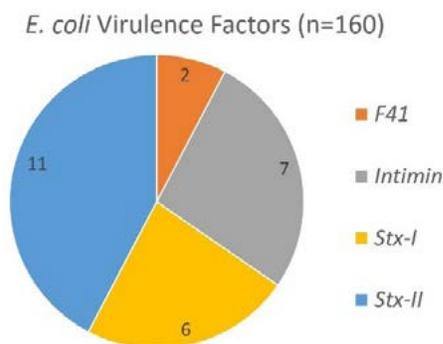
Enterohemorrhagic *E. coli* (Stx-I and Stx-II), attaching and effacing *E. coli* (Intimin), and enterotoxigenic *E. coli* (F41) have been identified from 160 neonatal calves. K99 virulence factor has not been detected thus far in the season. For salmonellosis cases, Dublin is the most common confirmed serotype.

Having more than one etiologic agent identified in a scouring animal, such as rotavirus and *E. coli* septicemia, is not unusual. Cryptosporidiosis, particularly, can be associated with immunosuppression, and concurrent infections are fairly common in this disease.

**Figure 1a: Causative agents of calf scours detected by PCR and bacterial culture.**



**Figure 1b: *E. coli* virulence factors associated with neonatal calf scours.**



# Mini Case Report

Spring is baby season for much of the animal kingdom. Newborns of any species are at increased risk for infections due to multiple factors, including poor immunological status, high nutritional demand, and the general stress of being born and living in a group with other animals. Common neonatal disease observed at the NDSU VDL include diarrhea, pneumonia and septicemia.

The first case is a **2-week-old female Ringtail lemur** (*Lemur catta*) that was found dead after three other neonatal lemurs from the same cohort died the previous week. Grossly, lung lobes were mottled red and pink and were heavy, wet and congested – lesions consistent with pneumonia.

Under the microscope, large airways were packed with cellular debris (necrosis) and acute inflammatory cells (Figure 2a). Smaller airways also were filled with inflammatory cells. Respiratory epithelial cells rarely contained one enlarged smudged nuclei, suggestive of adenovirus infection (Figure 2b, arrows).

Other features denoting underlying viral infection also were observed. Bacterial cultures were positive for *Bordetella bronchiseptica* and *Escherichia coli*. Pneumonia associated with *B. bronchiseptica* (one of the etiologic agents associated with canine infectious respiratory disease complex or “kennel cough”) has been described in nonhuman primates (NHP), including marmosets, tiki monkeys and bushbabies. The latter are prosimians, a subgroup of NHPs that also includes lemurs.

The organism is a known commensal (normal bacterium) in the nasopharynx of several NHPs, but disease can be associated with stressful conditions, such as overcrowding, recent shipping, being quarantined and poor husbandry. *E. coli* also can cause septicemia and death in neonates of many species.

PCR for common human adenoviruses was negative. However, lemurs are known to harbor their own species-specific adenoviruses that would not have been detected by the assay performed. Adenovirus infection is not uncommon in NHP neonates that have concurrent respiratory or systemic infections.

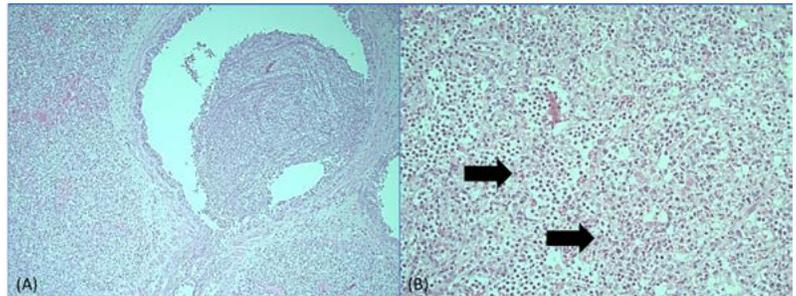
Another differential for neonatal pneumonia in lemurs is disseminated *Toxoplasma gondii* infection, which can be acquired *in utero*. Immunohistochemical stain was negative for this protozoan parasite. Thus, the cause of death was determined to be *B. bronchiseptica* pneumonia with likely underlying adenovirus infection.

The other case of neonatal disease is from a **10-day-old female Quarterhorse foal** that became recumbent and died after being treated for diarrhea. Field autopsy notes described a possible pneumonia, as well as hemorrhage along the ventricles of the heart.

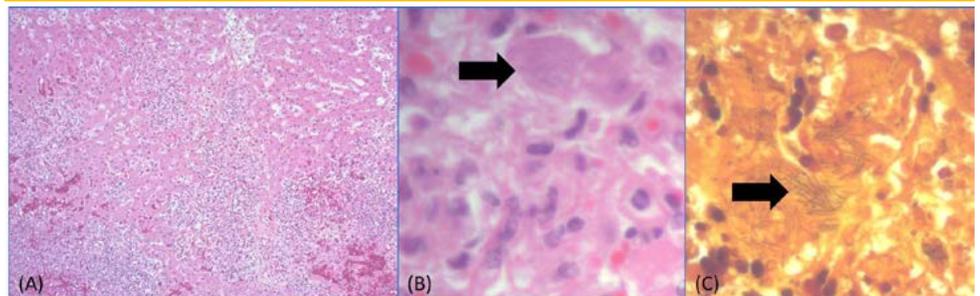
Microscopically, within the liver, were multiple and coalescing, random, nodular regions of cellular debris (necrosis) admixed with acute inflammation (Figure 3a). Along the periphery of the necrotic nodules were few hepatocytes with intracytoplasmic bacilli that were arranged in “haystacks” (Figure 3b). Special histochemical silver stain (Figure 3c) highlighted bacteria consistent with *Clostridium piliforme*, the causative agent of Tyzzer’s disease.

Besides hepatitis, *C. piliforme* infection can be associated with diarrhea and heart lesions – both of which were seen in this foal. Most cases of Tyzzer’s occur in 1- to 2-week-old foals; however, foals up to 6 weeks may succumb to the disease. Clinical signs may include diarrhea, jaundice (yellow tint to the skin, eyes or mucous membranes), fever, anorexia and recumbency. Tyzzer’s is more common in the spring when mares are out on lush pasture.

**Figure 2: Airways are filled with cellular debris (necrosis) and acute inflammatory cells in a neonatal Ring-tailed lemur with *Bordetella bronchiseptica* pneumonia (A). Inflammatory cells are primarily degenerate neutrophils (B) and rare enlarged nuclei are in respiratory cells, suggestive of adenovirus infection (arrows).**



**Figure 3: Necrosis and acute inflammation in the liver of a neonatal foal (a). Hepatocytes along the periphery occasionally contain intracytoplasmic bacilli that form haystacks consistent with *Clostridium piliforme* (b). Histochemical silver stain highlights the bacilli, confirming the diagnosis of Tyzzer’s disease (c).**



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## Staff Spotlight

We have some amazing people at the VDL, many of whom have worked here for decades. One staff member, Mary Finseth, has been at the VDL for more than 40 years and is known by many of you.

To kick off our inaugural *Staff Spotlight* section of the VDL newsletter, we thought Mary would be the perfect ambassador to highlight the fun people we work with every day. We asked Mary a few fun questions for you to get to know her better.

**How long have you worked for the VDL?** 42 years

**What's your favorite movie?** "Tootsie"

**What food have you never eaten but would really like to try?** Tamales

**Where are some unusual places you've been?**  
Top of Diamond Head in Hawaii, Monument Valley on the Arizona/Utah border, and West Point

**What's your cure for hiccups?** Never get hiccups

**What was the last song you sang along to?** "Gone" by Montgomery Gentry

Thanks to Mary for being a great team member! We'll share some fun facts about other staffers in the upcoming issues.



**Mary Finseth**  
(Photo by Kelly Benson,  
VDL chemist)



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For more information on this and other topics, see [www.vdl.ndsu.edu](http://www.vdl.ndsu.edu)

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