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

www.vdl.ndsu.edu

Feedback is always welcome. Please feel free to send your comments or suggestions to ndsu.vetlab@ndsu.edu and specify "newsletter" in the subject line.

NDSU Veterinary Diagnostic Laboratory

Director's Corner

The NDSU-VDL wishes you a happy and fruitful New Year!

We would like to acknowledge the recent passing of long-time veterinary anatomic pathologist, Dr. Ivan Berg. Dr. Berg was with the VDL for nearly three decades until his retirement in 1997. He is remembered for his quiet, soft-spoken demeanor and for riding his stationary bike in his office over lunch. Besides diagnosing veterinary diseases at the VDL, Dr. Berg participated in research studies focused on toxicoses in mice and swine, served as secretary-treasurer of the North Dakota Veterinary Medical Association and was the 1986 North Dakota Veterinarian of the Year.

As you may recall, Dr. Brett Webb stepped down from his tenure as director at the end of the year. Dr. Webb was instrumental in successfully planning and overseeing the building of our state-of-the-art facilities, as well as in maintaining full accreditation of the NDSU-VDL by the American Association of Veterinary Laboratory Diagnosticians (AAVLD), setting up the molecular diagnostic lab section, revamping the VDL website and selecting and developing the new laboratory information management system.

But that's not all! Dr. Webb stepped into any role or task asked of him – from managing the VDL facilities to heading nearly every laboratory section within the VDL. Because of Dr. Webb, our little lab on the prairie is on-par with many of the larger state diagnostic labs. I am so thankful for all the work he has done to set a solid foundation upon which we can build. He continues in the laboratory as a veterinary pathologist and remains a great asset to our mission.

I hope to further that mission, which is *to provide reliable testing and diagnostic support services to veterinarians, animal owners, producers, and the public health sector*. My goals as director for the next few years are to prepare the laboratory for AAVLD reaccreditation in 2023, to expand upon our strengths, which includes our expert faculty and staff, excellent laboratory services and outreach to regional veterinarians and farmers/ranchers, and to begin strategic planning for the next phase of the laboratory.

Your input is always welcome, and I look forward to any suggestions. Please do not hesitate to contact me with any of your questions.



Sincerely,

Heidi Pecoraro, DVM, Ph.D., Diplomate, ACVP
NDSU VDL Director

NDSU VETERINARY DIAGNOSTIC
LABORATORY
North Dakota State University

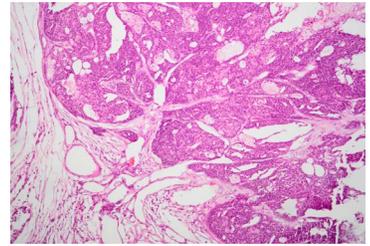
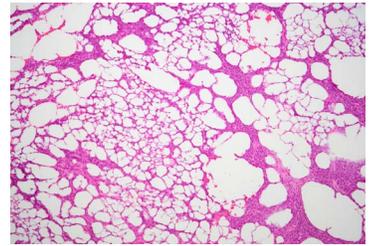
Bench Notes

UPS shipping – The discount shipping program has been restored. Please visit the shipping page at www.vdl.ndsu.edu/shipping/ for more information.

Brucella canis testing – In-house *B. canis* RSAT/2ME-RSAT testing is currently unavailable due to manufacturer supply issues. This assay will be a referral test until further notice. Please contact the laboratory with any questions on referral testing and shipping costs.

Streptococcus sensitivity testing – The NDSU-VDL will no longer routinely perform antimicrobial susceptibility testing (AST) on beta-hemolytic streptococcus species (*Streptococcus canis*, *S. agalactiae*, *S. equi* subsp. *equi*, *S. equi* subsp. *zoepidemicus*, *S. felis*, etc.). Due to the lack of resistance and predictable susceptibility of these isolates to beta-lactams (amoxicillin, amoxicillin-clavulanate, penicillin G), cephalosporins (cefepodoxime, cefovecin, ceftiofur) and trimethoprim-sulfamethoxazole, AST does not lend additional information for treatment choice. Treatment with the above antimicrobials is recommended because of increased regional resistance of these organisms to fluoroquinolones and aminoglycosides due to inappropriate first-line antimicrobial treatment. It is recommended to reserve use of fluoroquinolones and other antibiotics for treatment of multi-drug resistant organisms. AST will be offered by request from the laboratory; please contact the lab to request the additional testing, or if you have questions regarding AST.

Avoid freeze artifact – Winter is upon us here in the northern plains. With frigid temperatures, tissues in formalin can become frozen. Subsequent freeze artifact can severely impede evaluation of tissues and obscure important features that are necessary for an accurate diagnosis. During cold winter months with subfreezing temperatures, the addition of alcohol (isopropyl, methanol or ethanol) at a mixture of 1-part alcohol to 9-parts formalin will help prevent freeze artifact.



FREEZE ARTIFACT. These are images from similar skin tumors. Freeze artifact is present in the image on the top, leading to tissue loss and hampering an accurate diagnosis. The image on the bottom has no freeze artifact and there are clear histologic features. (Photomicrographs by H. Pecoraro)

Mini Case Reports

Dr. Quynn Steichen, NDSU-VDL veterinary anatomic pathology resident

This mini case report will focus on a common external parasite found in wild and domesticated poultry flocks.

Six chickens from the same flock, all housed together but in separate pens present to NDSU VDL for necropsy and histopathology. Grossly, all chickens have thickened skin on their shanks with protruding and enlarged scales. No other gross lesions pertaining to external parasites are appreciated.

Microscopically, the stratum corneum (surface layer of the skin) is characterized by diffuse, abundant, orthokeratotic hyperkeratosis that contains multifocal oval to elongate, 100 to 200 μm diameter clear spaces (mite tunnels). Frequently, within the mite tunnels are cross or tangential sections of an adult arthropod that is oval to elongate, approximately 200 μm in diameter, with an eosinophilic spiny chitinous exoskeleton, a hemocoel, striated muscle and focal accumulation of deeply basophilic nuclei. Mite tunnels contain scattered accumulations of brown, granular and globular material (mite feces). There are frequent intracorneal abscesses composed of viable and degenerate heterophils, eosinophilic cellular and karyorrhectic debris (necrosis).

The observed parasites are mites called *Knemidocoptes mutans*, also known as “scaly leg mite.” This is a common mite found in chickens, turkeys and pheasants affecting the non-feathered skin of the legs and occasionally the comb and wattles. All stages of the life cycle are on the bird and mites are transmitted via direct contact. Mites burrow into the skin and produce tissue swelling and enlargement of scales, causing the scales to protrude. Other clinical signs associated with infestation are severe weight loss, decreased egg production and digit necrosis that predisposes to secondary bacterial and fungal pyoderma. Treatment and prevention include antiparasitic therapy, disinfection of environment and implementation of biosecurity protocols.



There are scaly and crusty lesions over the non-feathered portions of the feet of an adult chicken. Microscopically, the superficial layer of skin is markedly thickened and contains 200-250 micron-sized mites consistent with *Knemidocoptes mutans*. (Photo and photomicrograph by H. Pecoraro)

REFERENCES – Hinkle and Corrigan. External Parasites and Poultry Pests. In: Swayne DE, ed. *Diseases of Poultry*. 14th ed. WILEY Blackwell; 2020

Disease Updates — Epizootic Hemorrhagic Disease in Ruminants

Dr. Liam Broughton, NDSU-VDL veterinary pathologist

Over the previous summer and fall there was an increase in epizootic hemorrhagic disease (EHD) cases across North Dakota affecting both wild and domestic ruminants. Cases were initially identified in our wild and farmed white tail deer (WTD) population, and as the outbreak progressed, began spilling over into our cattle and bison herds.

The purpose of this article is to provide information to our stakeholders, farmers/ranchers and veterinarians in North Dakota regarding EHD. This article will discuss general background information regarding EHD, the epidemiology of the 2021 EHD outbreak in North Dakota and end with current methods, or lack thereof, to control EHD.

EHD is a non-contagious, vector-borne viral pathogen of the genus Orbivirus. The non-contagious trait of EHD indicates that an infected animal cannot directly transmit EHD to another animal. EHD must first pass through an insect vector to cause an infection in naïve animals. This ruminant-vector cycle is how EHD is maintained in the wild over the winter. The insect vector for EHD is the biting midge (also called no-see-ums or *Culicoides sonorensis*), which is most active during the late summer and fall [1].

There are multiple variants of EHD, termed serotypes. These serotypes circulate in various parts of the world with serotype-2 the most common U.S. variant. Typically, EHD only causes clinical disease in WTD, though it can result in significant mortality events within deer populations. Clinical signs in WTD include rapid death, respiratory distress, excessive salivation, oral erosions, lameness, sloughing of hooves, fever, anorexia, and edema of the head and neck [2]. EHD has historically not resulted in significant clinical disease in cattle. When observed, reported clinical signs of EHD in cattle include oral and nasal ulcerations, salivation, fever, anorexia, lameness and dyspnea [2].

For the North Dakota outbreak of EHD in the summer and fall of 2021, the first diagnosed case was from a WTD on 8/23/2021, and the last detected case was in a bovid on 10/19/2021. In total, 26 of 36 cases tested for EHD at the VDL were positive during this two-month period (Table 1).

All cases for which serotype was performed were identified as serotype 2. When the location of positive EHD cases is plotted on a map, a geographic distribution of EHD cases in North Dakota emerge. All cases in which EHD were detected are from along the Missouri River. As expected, this distribution of cases closely mirrors the geographic distribution of the vector for EHD, *Culicoides sonorensis* [1].

Currently, there is no licensed vaccine for the prevention of EHD in cattle. Thus, mitigation of EHD in cattle focuses on limiting the interaction of the vector parasite with susceptible populations of animals. Techniques which have been utilized include aerial spraying of insecticides and use of animal treatments such as pour-on insecticides and long-acting insecticide imbued ear tags. Unfortunately, these methods are inefficient and use of insecticides for vector control must be performed following the label recommendations [3].

During the outbreak, many of the samples with detectable EHD were from cases of unexpected death with no other cause of death identified on postmortem examination (field necropsies) or on ancillary

Table 1: Breakdown of cases tested for EHD by species. The primary diagnostic modality utilized was qPCR to detect viral genes. Serology (AGID) was utilized to diagnose three of the eight cattle cases.

Species	EHD Positive	EHD Negative	Total
WTD	7	3	10
Bison	4	1	5
Cattle	8 (3 AGID)	4	12
Goats	1	0	1
Sheep	0	1	1
Elk	6	0	6
Mule deer	0	1	1
Total	26	10	36

N.D. EHD MAP. Locations of cases in which EHD was detected. Each red pin (22 total pins) indicates a positive EHD case. A total of 22 out of 26 positive EHD cases provided locations of sample submission.



diagnostics. Thus, in cases of unexpected death in ruminants during the late summer and fall in herds surrounding the Missouri River, EHD should be on the differential list.

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- Stevens, G. et al. "Review of the 2012 Epizootic Hemorrhagic Disease Outbreak in Domestic Ruminants in the United States." *PloS one* vol. 10,8 e0133359. 5 Aug. 2015, doi:10.1371/journal.pone.0133359
- Noronha, Leela E. et al. "Perspectives on the Changing Landscape of Epizootic Hemorrhagic Disease Virus Control." *Viruses* vol. 13,11 2268. 12 Nov. 2021, doi:10.3390/v13112268

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Dr. Broughton's Mystery Photo

The image is from a one-year-old male dog that has not been bred. History of wound on toe one week prior to presentation for swollen testes.

What's your diagnosis?

Possible causes?



Photo by L Broughton,
VDL pathologist

Visit the VDL Website (www.vdl.ndsu.edu) to see the answers and read more about the case.

Staff Spotlight

When did you start at the VDL? August 1999

What is your favorite holiday? Presidents' Day

Do you fold your pizza? Only if it is made with lefsa.

Which song could you listen to over and over again?
The Song That Never Ends

Choose one famous person from history you want on your team during a zombie apocalypse. *Houdini*

Calendar: Winter-Spring Closures

February 21 – Presidents' Day

April 15 – Good Friday

May 30 – Memorial Day



Lynn Schaan
Microbiologist

(Photo by Kelly Benson,
VDL chemist)



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