



Summer 2026, Vol. 10, No. 3

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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



Note from the Interim Director

After a hot summer with much of the state experiencing drought conditions, many in the region are welcoming the cooler autumn temperatures.

However, changing seasons bring new challenges for our producers and veterinarians out in the field. We are geared up for the upcoming fall season as it relates to the production cycle — herd health testing and bovine respiratory disease (BRD). In the issue, we feature a summary of 2025 BRD trends and introduce a new service and an upcoming resource for BRD management.

Dr. Michelle Mostrom, VDL toxicologist, retired in early August. Dr. Mostrom has served the laboratory and clients across the state and nationally since 2001. She leaves behind a legacy of excellence in toxicology. Toxicology testing remains in the capable hands of our long-time chemists, Beth and Kelly. Together, they have over 60 years of toxicology testing experience. Dr. Brianna Stenger has taken over blue-green algae identification, and Dr. Brett Webb has taken over interpretation of toxicology tests. We are actively recruiting a veterinary toxicologist.

I was grateful to have met with many of you at the North Dakota Veterinary Medical Association (NDVMA) Conference in Fargo this past month. I had the honor of presenting the NDSU Agriculture Core Values to the North Dakota Board of Animal Health and providing updates on disease trends and projects we are working on in the laboratory. We launched a client survey during the conference, and I was pleased with the number of responses we received. We will share summarized responses with clients later this year.

Thank you for your continued support. As always, please reach out to the VDL with any questions or concerns.

Kelli Maddock, DrPH, MS, MLS(ASCP)^{CM}
BSL-3 and Microbiology Section Head

Calendar: Upcoming Closures

November 11 — Veterans Day

November 26 — Thanksgiving Day

December 25 — Christmas Day

NDSU VETERINARY DIAGNOSTIC
LABORATORY
North Dakota State University

Mystery Photo

An aborted, male, 8.8 kg, Holstein fetus is examined. Out of 500 cows, three have aborted this month. This fetus was estimated to be 208 days in gestation.

What is your diagnosis?



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

Bench Notes

Shipping updates — The NDSU VDL provides veterinary clinics with the state-negotiated UPS shipping rate for ground or overnight air. We bill your clinic monthly for the use of this program. Ground delivery, up to three to five business days at the discretion of UPS, for packages less than 30 pounds, is \$15, and next-day air with priority morning delivery for packages less than 10 pounds is \$30. Access the shipping program at the following link: <https://www.vdl.ndsu.edu/shipping/>.

EIA (Coggins) testing schedule — The testing schedule for EIA (Coggins) will be Tuesdays and Fridays from Oct. 1 to Feb. 28.

Johne's serology (ELISA) testing schedule — The testing schedule for *Mycobacterium avium* subsp. *paratuberculosis* (Johne's Disease) will be Wednesdays and Fridays from Oct. 1 to May 31.

Specimen containers for Johne's PCR testing — Rigid plastic, leak-proof, sterile, screw cap containers are required to submit fecal samples/specimens for Johne's PCR testing. Additional processing charges will be applied to submissions that do not meet this requirement. Please check our resource section on our website for additional information: <http://vdl.ndsu.edu/johnes-containers/>.

Disease Update

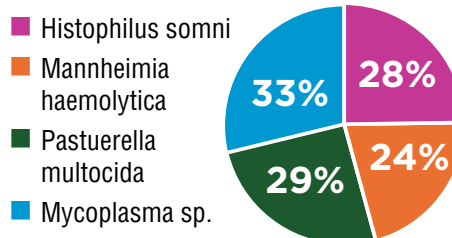
Summary of Bovine Respiratory (BRD) Disease 2025

Heather Mitchell, DVM

To help producers and veterinarians prepare for the fall respiratory season, the NDSU VDL has compiled a summary of bovine respiratory cases submitted in 2025. From August to December, the NDSU VDL received 109 bovine samples for respiratory testing, representing bison, beef and dairy cattle. Of the samples, 67% were from beef calves aged 9 months or younger.

Most of the submitted samples displayed negative results for viral respiratory PCR and positive bacterial growth, but a small subset was positive for both respiratory viruses and bacterial growth. Most of the samples, 76% (83/109), were negative for bovine coronavirus, bovine viral diarrhea virus, bovine respiratory syncytial virus or bovine herpesvirus, while 81% (88/109) of the samples produced multiple bacteria, including *Bibersteinia trehalosi*, *Trueperella pyogenes* and the common BRD pathogens *Mycoplasma* spp., *Pasteurella multocida*, *Histophilus somni* and *Mannheimia haemolytica*. *Mycoplasma* spp was isolated from 33% of the samples, *H. somni* was isolated from 28% of the samples, *M. haemolytica* was isolated from 24% of the samples and *P. multocida* was isolated from 29% of the samples (Figure 1).

Figure 1. Commonly isolated BRD pathogens from samples submitted to the NDSU VDL. Samples often contained 1 or more pathogen.



Of the samples, 40% (44/109) yielded two or more BRD pathogens. A small subset of samples, 23% (25/109), were polymicrobial infections and were either suspect or positive for bovine coronavirus, bovine viral diarrhea virus, bovine respiratory syncytial virus or bovine herpesvirus, in combination with growth of one or more bacteria.

Antimicrobial susceptibility testing (AST) results for common BRD pathogens showed evidence of antibiotic resistance. AST showed that 25% (8/32) of the *P. multocida* isolates were resistant to macrolide, tetracycline or fluoroquinolone antibiotic classes. Two *P. multocida* isolates were resistant to all three classes. Of the *M. haemolytica* isolates, 12% (3/26) were resistant to macrolide and tetracycline antibiotic classes. AST is not routinely performed on *H. somni* at the NDSU VDL at this time. Our microbiology department is currently preparing antibiograms (regional, summarized AST results) for BRD. This resource will be available to our clients at no additional charge to aid in antibiotic stewardship. In addition to antibiograms, the microbiology department will now add genotyping information to *M. haemolytica* isolates on culture results from cattle. Two major genotypes of *M. haemolytica* have been identified in cattle. Because of the association with BRD, AST will be performed only on genotype 2 strains.

Antibiotic resistance can have a significant impact on animal health and pose threats to both animal production and public health. We hope the 2025 BRD summary and antibiotic resistance information will be useful tools to use this fall to give our production animal and veterinary clients the information they need to make informed decisions.

Mini Case Report

Polioencephalomalacia

Quynn Steichen, DVM, MS, DACVP

Recent laboratory records indicate that water submitted from North Dakota grazing pastures has sulfate concentrations over the recommended maximum safe level for ruminants. Elevated sulfate concentrations can pose a significant health risk to ruminants, particularly young animals, newly introduced livestock or animals that have not gradually adapted to higher sulfate levels. Clinical consequences can range from diarrhea to polioencephalomalacia.

Early recognition of polioencephalomalacia is important, as it can progress rapidly and may affect multiple animals within a group when environmental factors are involved. Clinical signs include head-pressing, blindness, circling, “star-gazing” posture, staggering, recumbency and death.

When polioencephalomalacia is suspected, submission of appropriate samples is critical for obtaining a definitive diagnosis. Practitioners are encouraged to submit a complete set of tissues for necropsy evaluation, including the entire brain (cerebrum, cerebellum and brainstem), water sample and feed sample. The brain should not be placed in 10% neutral buffered formalin prior to submission but kept fresh. With a history of neurologic disease, rabies testing must first be completed and ruled out before additional diagnostic procedures can be performed.

Polioencephalomalacia is a condition that describes a pattern of brain injury but is not a single disease. The characteristic lesions lack etiologic specificity, meaning multiple underlying causes can produce similar findings. Differentials include water deprivation/sodium ion toxicosis, deficiency or disturbance in metabolism of thiamine, sulfur toxicosis and, sporadically, lead poisoning. When elevated sulfate concentrations are identified in water sources, sulfur toxicosis becomes an important consideration.

Typically, the brain is the most important tissue to evaluate in suspected polioencephalomalacia cases. Gross examination often reveals softening and yellow discoloration of affected cerebral cortical areas, consistent with laminar necrosis of gray matter. These lesions frequently occur within the vascular distribution of the middle and caudal cerebral arteries.

A useful diagnostic aid is examination of the brain under ultraviolet light. Areas of cortical necrosis may exhibit autofluorescence (Figure 2). This autofluorescence is associated with lipid metabolites in macrophages or high-molecular-weight collagen-like material. While autofluorescence supports a diagnosis of polioencephalomalacia, determining the underlying cause remains essential for case management and prevention.

Microscopically, the deep layers of cerebral gray matter are often most severely affected. Histologic findings include neuronal necrosis characterized by shrunken, acidophilic and angular neurons (Figure 3). Early lesions may also demonstrate

edema extending into adjacent white matter along with hypertrophied capillaries and reactive endothelium (Figure 4).

As elevated sulfate concentrations continue to be identified in some water sources, PEM should remain on the differential list for cattle and other ruminants presenting with neurologic signs. Prompt recognition, submission of appropriate tissues and water quality testing can help identify the underlying cause and prevent additional losses within a herd. Collaboration among producers, veterinarians and diagnostic laboratories remains key to successful case investigation and herd health management.

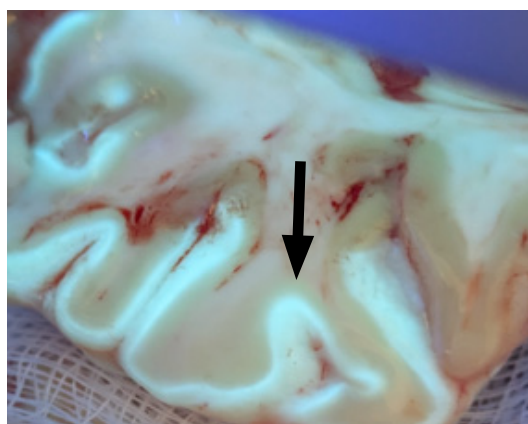


Figure 2. Cerebrum. Autofluorescence of the cerebral gray matter (arrow).

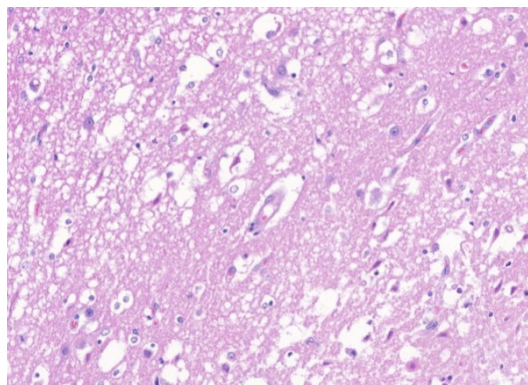


Figure 3. Cerebrum. Neuronal necrosis.

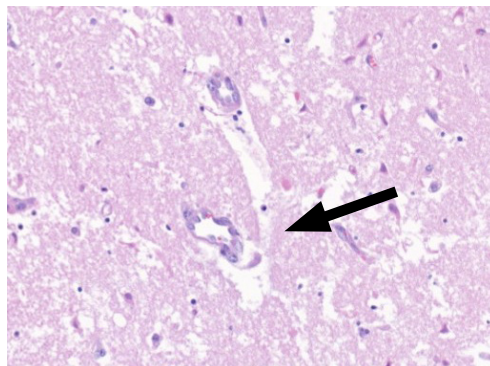


Figure 4. Cerebrum. Edema surrounding blood vessels with reactive endothelium (arrow).

NDSU Veterinary Diagnostic Laboratory

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Employment Opportunity: Veterinary toxicologist

At the NDSU VDL, we combine innovation, quality and expertise to safeguard animal health and support the industries that depend on it. We are currently seeking qualified applicants to oversee the toxicology laboratory.

The Toxicology Department at the NDSU VDL delivers cutting-edge analytical testing backed by nationally recognized expertise. Our laboratory is widely recognized for expertise in ergot alkaloid in small grains and mycotoxin testing in feed. We provide water testing, cyanobacteria identification and cyanotoxin detection services for livestock water sources. Finally, we offer trace mineral and heavy metal testing to ensure optimized nutrition. Our team is committed to delivering results that support informed clinical and herd management decisions. Rigorous quality assurance protocols, validated methods and continuous proficiency testing ensure the highest standards of diagnostic excellence.



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For more information on this and other topics, see www.vdl.ndsu.edu

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