Colorado State University
Veterinary Diagnostic Laboratories

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Report Date: 5/19/2022 9:19:22 AM
Sent By: [redacted]

Final Report

Case Coordinator: [redacted]

Accession No: F22-0039653
Date Received: 4/23/2022
Collection Date: 4/23/2022
Owner/Producer: BLM- Canon City Complex

[redacted]

Phone: [redacted]

Associated Parties

Clinic	[redacted]
Report To	USDA BLM Mustang Rescue Program Albert J Kane
Veterinarian Submitter	[redacted]

Animal Information

Name	Taxonomy
Horse- 2	Horse - Mustang

Diagnosis/Case Summary

F22-39653 Equine, Green tape lower hind limb, chip # 840003218849563 or 840003218849338

HISTORY:

Die off of Mustangs in the BLM facility Canon City CO.23 April 2022

GROSS LESIONS:

1. Body condition: Good.
2. Lungs: Fail to collapse, wet and heavy, mottled with pale firm (foci pneumonia) and dark red regions (hemorrhage), large volume of white froth in trachea, nasal cavity, and bronchi.
3. Lung: Firm dark region lower middle lobe, exudate expressed from cut bronchioles.
4. Mouth: No ulcers observed.
5. All other internal organs are within normal limits.

GROSS DIAGNOSES:

1. Lungs fail to collapse, with acute diffuse edema and patchy pale regions necrosuppurative bronchitis and bronchiolitis and pneumonia in regions.
2. Lung: Severe regional extensive suppurative bronchopneumonia.

HISTOPATHOLOGIC DIAGNOSES:

1. Lungs: Severe acute necrosuppurative bronchitis and bronchiolitis with regional extensive subacute suppurative bronchopneumonia.
2. Small intestine: Mild lymphoplasmacytic enteritis (parasites not observed).

COMMENTS:
This horse does have a severe diffuse necrosuppurative bronchitis and bronchiolitis with large regions of subacute suppurative bronchopneumonia. Influenza A subtype H3 was detected in lung tissues. *Streptococcus equi ssp. zooepidemicus and Actinobacillus sp* were isolated from the lungs. The agents isolates from the lungs could typically cause such lesions as found in the lungs. Further lab work is being done to further classify the Influenza virus, these results will be reported separately.

HISTOPATHOLOGY:
Slide 1.
Five sections of lung are examined. Two of the sections show lesions identical as described in case F22-0039652. These lesions are characterized by a necrotizing bronchitis with the lumina being filled with exudate and degenerated neutrophils. They are surrounded by a mild infiltration of lymphocytes. The other sections are more consolidate and show extensive necrosis and alveolar spaces being filled with edema, fibrin, and degenerated neutrophils; however, the majority of the inflammation is still located within the bronchioles and bronchi coursing through these areas of consolidation. In a few areas, colonies of bacteria can be observed.

Slide 2.
Heart: No significant lesions.
Kidney: No significant lesions.
Spleen: The lymphoid tissue of the spleen is somewhat depleted. The red pulp is of normal cellularity.

Slide 3.
Stomach: No significant lesions.

Slide 4.
No significant lesions.

[redacted]
Prelim: 4/26/2022 TRS
Full Report: 5/11/2022 ljb

Lab Findings

Bacteriology

Aerobic culture - 4/28/2022 11:30 AM

Specimen	Aerobic growth	Aerobic growth amount
Horse- 2		
Tissue-Lung - 4	Streptococcus equi ssp. zooepidemicus	Heavy
	Actinobacillus species	Moderate
Tissue-Lung - Consolidated	Streptococcus equi ssp. zooepidemicus	Heavy
	Actinobacillus species	Heavy

Biotechnology/Regulatory

Influenza (H3 subtype) real-time PCR - 4/27/2022 8:33 AM

Specimen	Nucleic acid	Ct
Horse- 2		
Tissue-Lung	Detected	30.84

Influenza A virus real-time PCR - 4/26/2022 3:35 PM

Specimen	Nucleic acid	Ct
Horse- 2		
Tissue-Lung	Detected	27.15

Equine arteritis virus (EVA) real-time PCR - 4/26/2022 3:25 PM

Specimen	Nucleic acid	Ct
Horse- 2		
Tissue-Lung	Not detected	0.00

Horse- 2 - Cerebral Spine Fluid

Test: Equine herpesvirus types1 and 4 (EHV-1, EHV-4) PCR - 4/26/2022 11:32 AM	
EHV-4 conventional PCR	Not detected
EHV-1 (neurologic) real-time PCR	Not detected
EHV-1 neurological Ct	0.00
EHV-1 (wild type) real-time PCR	Not detected
EHV-1 wild type Ct	0.00

Horse- 2 - Tissue-Lung

Test: Equine herpesvirus types1 and 4 (EHV-1, EHV-4) PCR - 4/26/2022 11:32 AM	
EHV-4 conventional PCR	Not detected
EHV-1 (neurologic) real-time PCR	Not detected
EHV-1 neurological Ct	0.00
EHV-1 (wild type) real-time PCR	Not detected
EHV-1 wild type Ct	0.00

General Results
Results for Real-time PCR are measured by Ct value. The Ct value correlates with original amount of target nucleic acid in the sample and is inversely proportional (the lower the Ct value the higher the starting amount of nucleic acid). Ct values ranging from 12-36.99 are positive. Ct values ranging from 37.00-40.00 are suspect/weakly positive. A Ct of 0.00 is interpreted as a negative result.

Chemistry Toxicology

Horse- 2 - Tissue-Fixed - liver

Test: Selenium HAAS - 5/18/2022 3:52 PM	
Selenium	1.9 ppm(dw)

Molybdenum GFAAS - 5/17/2022 4:43 PM

Specimen	Molybdenum
Horse- 2	
Tissue-Liver - 5	5.7 ppm(dw)

Magnesium FAAS - 5/17/2022 3:16 PM

Specimen	Magnesium
Horse- 2	
Tissue-Liver - 5	460 ppm(dw)

Copper FAAS - 5/17/2022 12:41 PM

Specimen	Copper
Horse- 2	
Tissue-Fixed - liver	20.0 ppm(dw)

Zinc FAAS - 5/17/2022 12:30 PM

Specimen	Zinc
Horse- 2	
Tissue-Fixed - liver	274 ppm(dw)

General Results
COPPER Diagnostic level
Equine: Liver (DW)
Normal 15-30 ppm
Deficient < 12 ppm
Toxic > 3,000 ppm

MAGNESIUM Diagnostic level
Equine: Liver (DW)
Normal 520-800 ppm

SELENIUM Diagnostic level
Equine: Liver (DW)
Normal 1.0-4.0 ppm
Deficient 0.5-0.8 ppm
Toxic > 10.0 ppm

General Results

ZINC Diagnostic level
Equine: Liver (DW)
Normal 160-500 ppm
High 640-2,000 ppm
Toxic > 5,000 ppm

Please note that there is no published normal **MOLYBDENUM - LIVER** concentration range available for **EQUINE**, therefore the diagnostic information for **BOVINE** has been provided for comparison.

MOLYBDENUM Diagnostic level
Bovine: Liver (DW)
Normal 0.6-6.0 ppm
Toxic > 10.0 ppm
Note that molybdenum toxicity occurs only when copper levels are deficient. Molybdenum levels in the toxic range are not a problem when copper levels are normal.

Pathology

Necropsy histopathology - 5/11/2022 2:36 PM

Specimen	Histopathology
Horse- 2	
Whole Animal - 2	Complete

Necropsy-equine gross examination only - 5/11/2022 2:36 PM

Specimen	Necropsy
Horse- 2	
Whole Animal - 2	Complete

Client Report History

Report Type	Delivery Method	Sent To	Date Sent
[redacted]	[redacted]	[redacted]	[redacted]

Bulletin(s)

Thank you for choosing CSU for your diagnostic services. If you have any questions about test interpretation, we are happy to provide assistance. Please consult a licensed veterinarian regarding treatment options and management decisions