

# Diarrhea outbreak associated with corona virus in adult goats

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## Introduction

Coronaviruses have been demonstrated to infect a wide variety of hosts and have an affinity for the respiratory and gastrointestinal tracts. Adult diarrheal outbreaks in cattle and horses have been associated with coronaviruses. Coronavirus has not been previously reported as a significant pathogen in goats. The purpose of this study was to describe the demographics, clinical and fecal PCR results of an outbreak of diarrhea in adult goats associated with a coronavirus (CoV).

## Materials and Methods

Herds with adult goat diarrhea that attended 1 of 2 dairy goat expositions in Northern California in the summer of 2017 were identified after being contacted by the authors. Herd where included if they had adult animals exhibiting signs of altered fecal consistency within 2-5 days of attending the exhibitions. Follow-up with the herd owner was performed by email survey. Fecal samples from 2 affected herds were submitted for diagnostic testing to the California Animal Health and Food Safety Laboratory, UC Davis (CAHFS). The initial samples were tested for BCoV by PCR. Subsequently, all adult animals in those 2 herds were tested using PCR detection for BCoV on feces or rectal swabs at the Real-time PCR Research and Diagnostics Core Facility University of California, Davis. Feces and rectal swabs from these herds were PCR tested weekly for 4 weeks for BCoV. A closed herd of goats with no history of exhibition or travel as also sampled at the first time point. Feces from 3 different individual was used to sequence nucleocapsid (N) protein of the coronavirus using Sanger sequencing and

a phylogenetic analysis was performed using NCBI Blast and Molecular Evolutionary Genetics Analysis version 7.0.

## Results

Twelve herds, representing more than 450 goats, were identified as having multiple animals with diarrhea. The morbidity ranged from 15-90% and the reported mortality was <0.3% (1 reported mortality). Other clinical signs included decreased milk production, anorexia, fever, and cough. Of the initial 5 samples submitted to CAHFS 80% (4/5) were PCR positive for BCoV. In the whole herd sampling of 2 affected herds 40% (10/25) of the goats tested positive for BCoV (17 days after the initial clinical signs in these herds). At the 3 additional samplings the proportion of PCR positive animals decreased (day 26 : 28% (7/25), day 35: 17% (4/25)) until both herds were 100% negative at day 41. Corona virus was not detected in any goats from the closed (control) herd. The N protein gene identified this coronavirus as being closely related to a wild-type bovine corona virus strain E-AH65, which as also been shown to affect captive wild ruminants.

## Significance

This abstract presents evidence that this outbreak of diarrhea in adult goats was associated with coronavirus. It appears to be highly contagious and is likely spread through contact with infected animals or contaminated equipment, facility or humans. Care should be taken to practice good bio-security measure when dealing with diarrhea in adult goats.