Coronavirus Outbreak in a Beef Herd

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Introduction

An abnormally high incidence of respiratory and enteric disease was noted in a herd of spring born Angus calves of 1-3 months of age. The cows were being fed free choice prairie hay and corn silage twice per day. Extensive vaccination for IBR, PI3, BVD Types I & II, Clostridial perfringens Types C & D had existed in the herd for more than 4 years. An E. coli, rotavirus, coronavirus and Clostridial perfringens vaccine was administered to all cows prior to calving, but only a portion of the cows received the recommended second dose, and none of the cows received the recommended third dose. The owner reported poor response of calves to antimicrobial treatment as determined by failure of temperature to decrease and failure of calves to improve in mentation and activity. No deaths were reported by the owner. No illnesses had been noted in the cow herd. No history of herd testing for BVD existed and due to the poor response to seemingly appropriate treatment, BVD was suspected. Bovine Corona Virus (BCV) was also suspected due to the high percentage of calves with both enteric and respiratory disease. The herd was under open management with new animals being purchased but no pre-purchase testing being performed. Unseasonably wet and cold conditions were present for two weeks prior to the outbreak. Due to the increase moisture wet feeding areas and abnormal amounts of manure/mud accumulation was suspected of being a contributing factor in the disease processs.

Materials and Methods

BVD cELISA was performed on all calves and cows that did not have a live calf at the time of sampling. BCV culture was initially performed on nasal swabs from 5 sick calves. Eight days later BCV testing was performed on fecal samples from all 71 cows and nasal swabs from all 55 calves. Soil samples were obtained from several creek beds, feeding areas and other areas of the ranch where cattle were housed. Antigen cELISA was performed on soil around round bale feeders, feedbunks and water tanks where the cattle were housed.

Results

All BVD cELISA tests were negative. Three of the 5 nasal swabs taken on moribund calves were positive for coronavirus. Fifty-five of the fecal samples from the cows were positive for BCV and none of the nasal swabs on the 55 calves were positive for BCV. There was a 1-2 hour delay from nasal swab sample collection to the time the samples were added to media. Soil samples revealed high concentrations of BCV antigen present around the round bale feeders, feed bunks and water tanks.

Significance

Due to the presence of both enteric and respiratory disease an immunosuppressive agent was suspected. Based on herd management and history, the presence of a persistently infected BVD animal was a strong possibility. Testing of the cows and calves indicated that a PI animal was not present in the herd, but could not rule-out acute BVD as a potential contributor to this outbreak. Fifty percent of BCV infections result in a combined enteric/respiratory disease in calves. The presence of BCV in 3 of the 5 nasal swabs was highly indicative of BCV being the cause of respiratory disease in these calves. Failure to culture BCV from the nasal swabs collected from all 55 calves could be attributed to the short shedding period of BCV from the respiratory tract or due to the delay of getting samples into media. The presence of BCV in these calves led us to suspect BCV as the primary etiological agent in this disease outbreak. BCV is a very labile virus in the environment. The high concentrations of BCV antigen found in the soil indicated shedding within the cow herd. Fecal culture of the cow herd indicated that primary soil contamination was occurring from 90% of the cow herd. Typically non-clinical cows will only shed coronavirus during times of increased stress. Since no management changes or animal additions had occurred since the start of calving season, the sudden change in weather was attributed to the high degree of BCV shedding in the cows.