

Investigation of Calf Mortality in Western Colorado

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Introduction

Calf mortality in a beef operation can be caused by many factors. These factors may include dystocia, cold stress, infectious diseases (BVD, Clostridium spp., Mannheimia haemolytica), and poisonous plants. On most large beef operations in the Western US, the causative reasons for these losses are unknown or unappreciated. Many times the number of calves alive at weaning is significantly lower than those born and lower than those that were alive at branding. Branding is typically done on many beef operations in the Western United States from 1-3 months of age. Information is lacking on the reasons for losses of calves from branding to weaning. Part of this is due to the fact that on most beef operations the cattle and calves are on the range and are observed infrequently or only at times of livestock movement for range management considerations. The primary objective of this investigation was to identify the causes of calf mortality from branding to weaning on an extensively managed beef cow operation. The chosen operation was located on the Western Slope of Colorado in a known copper deficient area and had a history of losing approximately 2% of calves from branding to weaning. The operation also reported that this had increased over the past two years. A second objective was to identify risk factors that might be contributing to these calf losses.

Materials and Methods

The herd in question was a family owned cow/calf operation with approximately 2000 pregnant cows and heifers. In addition, about 350 heifers were kept for replacements each year. Two groups of cows were maintained on summer BLM allotments. Heifers calving for the first time were calved separately, and later mixed with cows 3-5 years of age, while cows 6 years of age and older were maintained separately. Some BLM allotments for winter grazing may have contact with or common grazing with other permittees livestock. Visits were made to the ranch so that calves could be visualized and sampled. If possible, calves that died were to be necropsied and a liver sample obtained. The experimental design was to obtain blood samples from both unvaccinated and vaccinated calves at or near branding. In fact, blood samples were obtained from a total of 22 calves between 2-4 months. Of these calves, 13 were unvaccinated calves at branding with 10 healthy and 3 unthrifty, unhealthy calves. Nine samples were collected from vaccinated calves with 2 identified as sick calves, 2 more were from unthrifty, bum or orphan calves, and 5 from healthy calves at weaning that were not shipped because they did not meet the weight requirement. Vaccinated calves had received Bovishield-4® and One Shot Ultra 8® at branding. Samples were identified by calf ID (if possible) and sex. Blood was collected in 10ml EDTA tubes, refrigerated, and delivered to the Colorado Veterinary Diagnostic Laboratory within 3 days of collection. A Respiratory Serology Panel and BVD Virus Isolation ELISA were conducted on each blood sample. The Respiratory Serology Panel included testing for antibodies to IBR, BVD-I, BVD-II, BRSV, and PI-3. The purpose of the BVD Virus Isolation was to identify persistently infected BVD calves.

In addition, water samples were to be taken from selected springs, reservoirs collecting runoff, creeks, and sources of hauled water. This was to determine the relationship between ingested water and possible trace mineral concerns. Water samples were

tested for levels of calcium sulfate, phosphorus, aluminum, iron, manganese, copper, zinc, nickel, molybdenum, cadmium, chromium, and barium. Samples were analyzed by Colorado State University Soil, Water & Plant Testing Laboratory.

Results

Respiratory Serology Panels indicated 7 (4 unvaccinated and 3 vaccinated) calves had exposure to type II BVD. These calves had type II BVD titers which were more elevated than titers to type I BVD. Antibody titers to type I BVD were consistent with maternal antibodies. No calves were found to be persistently infected with the BVD virus among those sampled. Nine unvaccinated calves had PI-3 titer of >256 indicating exposure. Also found in the vaccinated calves were elevated titers to PI-3. A single unvaccinated calf was found to have an elevated titer to IBR. Two samples were taken from a sick calf so a comparison could be made on this animal. Comparison of the acute phase sample and the sample taken during recovery revealed an increase in antibody titers to IBR and type II BVD. Antibody titers to BRSV were consistent with maternal antibodies but titers were higher in some unvaccinated calves compared to vaccinated calves. Water analysis revealed none of the water sources exceeded the EPA suggested limits for livestock use. Mineral analysis of the mineral block used by the producer is still under way at this time.

Discussion

Interpretation of the data suggests that type II BVD was circulating in the herd. However, there was not enough evidence to prove type II BVD was the main cause for the mortalities in the calves as no necropsies were performed. Exposure to type II BVD was based on titers to both type I and II BVD. In some unvaccinated calves, type II BVD titers were four-fold higher or more than type I BVD titers suggesting exposure of the calves or exposure of the dams to type II BVD. If type II BVD could be established as a leading cause, eradication of BVD from the herd should be considered. An eradication plan could include further testing to identify and remove persistently infected (PI) animals. This plan could include testing replacement heifers before the breeding season to prevent contact between PI and pregnant heifers. The entire herd could also be tested before breeding season but, this would be expensive in a herd this large and would require individual identification. A plan could be based on weight and appearance of the replacement heifers, as many PIs tend to be poor doers. There would be limited success because not all PIs are poor doers and some PIs may be indistinguishable for healthy animals. Culling heifers which do not meet weight requirements could help to decrease the number of PI heifers entering the herd and decrease exposure of pregnant heifers. Further investigation is needed to determine the causes and factors leading to the deaths of the calves.