

confirmed pregnant were found open. Nine other South Dakota ranchers were identified as having purchased bred cows from the same sale. The sale was held on November 19, 2013 at a north-central South Dakota auction market. All cows originated from a single North Dakota ranch. The heifers were bred to calve in May 2014, and were ultrasounded to confirm pregnancy by a veterinarian on October 17, 2013.

### Materials and Methods

Because of the high rate of open cows in 1 of the purchased groups, the remaining 9 herds subsequently had their purchased bred cows re-examined for pregnancy during December 2013 or January 2014. Additionally, because of the diagnosis of *Neospora caninum* in 1 of the affected groups, the 10 herds sampled cows for the presence of *N. caninum* antibody. All herds were sampled between January 14 and January 31, 2014. Eight herds tested all purchased animals, while 2 herds tested some of the purchased animals. Serologic testing was performed at the South Dakota State University (SDSU) Animal Disease Research and Diagnostic Laboratory via an ELISA test. An inhibition of  $\geq 30\%$  was considered positive for *N. caninum* antibodies. Information regarding cow pregnancy status was provided with the submissions.

### Results

The size of the purchased groups ranged from 12 to 376 (average=87). Following re-examination for pregnancy, open cows were detected in 10 of 10 purchased groups. Open rates in these groups of previously-confirmed-pregnant cows ranged from 8 to 31% (average=22%). In all, 205 out of 866

cows (24%) were diagnosed “not pregnant” by their herd veterinarians. The overall *N. caninum* seropositive prevalence for purchased animals was 17.6%. However, there were marked differences in seropositive prevalence between open and pregnant animals. Open cows had an overall seropositivity prevalence of 78% (range=50 to 100%), while cows still pregnant had an overall prevalence of 7% (range=3 to 18%). In these animals, the odds of an open cow being *N. caninum*-positive were 46.7 times that of pregnant cows being seropositive (95% confidence interval=26.8-81.6). Pathologic diagnosis of *N. caninum* was not obtained in 8 subsequent abortion submissions to SDSU from these groups, nor was a point source of infection identified for these animals.

### Significance

Evidence pointing to *N. caninum* as a cause of reproductive loss in these animals included an extremely high association between seropositivity and non-pregnancy, a higher overall seropositivity prevalence in these herds compared to expected background levels in the Northern Plains, and the lack of other infectious agents consistently identified in serology or pathology submissions. Evidence supporting a cause of reproductive loss in these animals prior to sale includes the consistent open rates found across the 10 groups. While diagnostic pathology on fetal tissues should always be employed in cases of pregnancy loss, these materials are not always available or suitable. Serology may be a valuable tool to identify *N. caninum* exposure as a potential cause of reproductive failure, especially when there are differences in seropositive prevalence between open and pregnant animals.

## Behavior variables of feedlot cattle clinically diagnosed with bovine respiratory disease versus case control

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### Introduction

Current bovine respiratory disease (BRD) diagnostic methods in the commercial feedlot setting are limited to subjective visual assessment of clinical signs; sensitivity and specificity of this method is poor. Continuous monitoring of

step count, lying bouts, and duration of standing time via accelerometer device will provide insight into the behavior of clinically ill cattle and characterize the pattern of behavior change before clinical BRD diagnosis. Our primary objective was to elucidate behavior variable responses in relation to the timing of clinical disease observations by animal health

technicians in a commercial feedlot, and compare behavior of cattle clinically diagnosed with BRD to a healthy cohort. A secondary objective was to determine BRD morbidity rate for cattle according to arrival castration status and initial body weight quartile.

### Materials and Methods

Four hundred male beef cattle procured from auction markets in south Texas were received in 4 different arrival blocks at a commercial feedlot near Hereford, Texas. During initial processing, cattle were fitted with an accelerometer device proximate to the metatarsus of the right rear limb. Accelerometers recorded duration of standing time (min), number of steps traversed, number of lying bouts, and a proprietary motion index; the sum of each variable was reported in 15 min increments. Pooled means for each activity variable were generated by day. Data were analyzed to determine the mean  $\pm$  standard error for the time period of d -5 to -3 and the mean  $\pm$  standard error on d -1 relative to clinical BRD diagnosis. Because clinically ill cattle were removed from the pen and treated according to a standardized antimicrobial regimen, the normal pen-based behavior variables were likely confounded and thus, data from the day of treatment was not used. Furthermore, the effect of arrival castration status (bull or steer), arrival body weight quartile, and arrival block on BRD morbidity rate were determined using chi-square analysis.

### Results

Among the current study population, the overall incidence of primary, secondary, and tertiary clinical BRD diagnoses was 51.5%, 15.2%, and 4.5%, respectively. The

overall BRD-associated mortality rate was 5.9%. There was a tendency ( $P=0.10$ ) for an increase in BRD morbidity observed for cattle arriving as bulls (53.9%) vs steers (44.9%). The BRD morbidity risk for cattle categorized in lower (<25%), intermediate, and upper (>75%) initial body weight quartiles was different ( $P=0.06$ ) and averaged 50.7%, 44.8%, and 38.7%, respectively. Duration of standing on the day previous to BRD treatment (d -1) was  $560 \pm 1.9$  min for cases compared to  $601 \pm 0.3$  min for controls. The difference in average standing time between the period d -3 to -5 and d -1 relative to BRD diagnosis was  $-28.5 \pm 1.5$  and  $5.0 \pm 0.6$  in cases and controls, respectively. Likewise, steps on d -1 relative to clinical BRD diagnosis were less for clinically ill cattle ( $843 \pm 7.8$  steps) vs control ( $1,186 \pm 2.2$  steps). The change in average step count between the period d -5 to -3 and d -1 relative to clinical BRD diagnosis was  $-123 \pm 4.2$  and  $50 \pm 2.3$  in cases and controls, respectively. Lying bouts were also reduced for clinically ill cattle (11.4) vs control (14.5) on d -1. The difference in average lying bouts between the period d -3 to -5 and d -1 relative to BRD diagnosis was  $-0.6 \pm 0.04$  and  $0.7 \pm 0.03$  in cases and controls, respectively.

### Significance

Our data suggest that cattle arriving as bulls and those with a lighter initial body weight are diagnosed with clinical BRD more often. The behavior of cattle with clinical BRD was altered; standing duration, steps taken, and lying bouts were less compared to the cohort never diagnosed with clinical BRD. These data may assist practitioners in better understanding the behavior of clinically ill cattle and provide a framework for determining the efficacy of cattle behavior variables as an early BRD detection method.

## Weight gains in suckling beef calves treated with macrocyclic lactone anthelmintics in either an extended-release injectable formulation or a pour-on formulation

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### Introduction

The objective of this trial was to test the hypothesis that treating suckling beef calves grazing summer pastures

with an extended-release injectable parasiticide containing eprinomectin (ERE) would result in additional weight gain when compared to ivermectin in a pour-on (POI) formulation. Extended-release eprinomectin contains the anthelmintic