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 ± standard error for the time period of d -5 to -3 and the mean ± 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 ± 1.9 min for cases compared to 601 ± 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 ± 1.5 and 5.0 ± 0.6 in cases and controls, respectively. Likewise, steps on d -1 relative to clinical BRD diagnosis were less for clinically ill cattle (843 ± 7.8 steps) vs control (1,186 ± 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 ± 4.2 and 50 ± 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 ± 0.04 and 0.7 ± 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 sucking beef calves treated with macrocylic 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

with a poly-lactide-co-glycolic-acid polymer allowing slow release of eprinomectin following injection with a label claim for protection against reinfection with *Cooperia oncophora* and *Cooperia punctata* for 100 d and *Ostertagia ostertagi* for 120 d. Pour-on ivermectin claims 21 d control for *C. punctata* with 14 for *O. ostertagi* and *C. oncophora*.

Materials and Methods

Nine-hundred and twenty nine spring-born calves grazing on 22 pastures in Virginia, USA were enrolled. Pastures were permanent and continuously grazed (stocking rate of 0.5 to 1.5 ha/pair).One-third of the calves in each pasture were assigned to ERE, the other two-thirds were assigned to POI. Calves assigned to treatments were blocked by sex, sire, artificial insemination (AI) vs natural service, Angus vs Simmental sired, and age. Calves were assigned, weighed, and treated in late June/early July when gastrointestinal parasite infections in calves increase as grazing replaces nursing and seasonal conditions promote infective L3 larval development and distribution. Calves were weighed mid-trial (average= 49 d post-enrollment) and again at weaning (average = 103 d post-enrollment). Fecal samples from a subset of calves were tested for fecal egg counts from each treatment group within each pasture at the start of the study and again 14 d later for fecal egg count reduction evaluation as well as at weaning. Care givers and study personnel were blinded to calf treatment assignments. Weight gains were analyzed using PROCC GLM of SAS version 9.3. The analyses were performed separately for the 3 outcome variables. Other variables in the models included location, gender, crossbreed, AI vs. natural service, age of dam, treatment (ERE or POI) and 2-way interactions. Backward elimination procedure created a final model ($P \leq 0.1$ for inclusion) with treatment forced into the model.

Results

Calves gained, on average, 209 lb (94.8 kg) from enrollment to weaning with a standard deviation of 63.9 lb (29.0 kg). Weight gain differences for ERE vs POI for start to mid-trial and mid-trial to weaning were not significant ($P>0.05$). There was a 5.5 lb (2.5 kg) advantage in weight gain for the ERE over the POI calves ($P=0.04$) from enrollment to weaning. Of the 22 pasture groups, 10 had mean gains where POI was superior to ERE, ranging from a 0.09 (0.04 kg) advantage to a 43.6 lb (19.8 kg) advantage. Twelve pastures had mean gains where ERE was superior to POI ranging from an advantage of 0.44 lb (0.2 kg) to 63.9 lb (29.0 kg). Fecal egg count analyses and coprocultures confirming that pastures were naturally infected with both *Cooperia* spp and *Ostertagia* spp are reported elsewhere.

Significance

Treatment of nursing calves at mid-summer with ERE showed a measureable but modest increase in weight gain compared to. calves treated with POI. The location by treatment interaction indicates parasite challenge differences due to stocking rates, grazing history and different pasture conditions. Housing all of the calves in same pasture might have had an influence on the outcome, but was preferable to housing ERE and POI calves in separate pastures where pasture variation might have large and immeasurable effects. Calves treated with ERE might have consumed and killed larvae, thus reducing the contamination challenge for the POI calves. The large variation in calf gain (SD=63.9 lb or 29.0 kg) suggests that other factors, such as dam milk production and genetic propensity for **growth)than those used in our models may be major contributors to calf gain.** In light of the current high price for weaned calves, even the modest increase in gains makes the use of ERE financially viable. Users should be aware, however, that in some settings there may be no weight gain benefit to treatment with ERE.

Zelnate™: a novel approach to BRD management in cattle

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Introduction

Bovine respiratory disease (BRD) continues to have a major economic impact on the beef and dairy industries while public perception supports reduced antimicrobial use. The objective of this research was to evaluate the efficacy of a novel non-antimicrobial, CpG motif-based DNA immunostimulant formulated in a liposome carrier (Zelnate) in the management of BRD. The program was composed of 2 phases: 1) product development and licensure, and