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Introduction

Light weight stocker calves often experience health problems shortly after arrival to feeding facilities. Preventative health programs are routinely administered to calves upon arrival to reduce the incidence of Bovine Respiratory Disease. The major route of vaccine administration in cattle is via injection through either intramuscular or subcutaneous routes. Several products have been introduced that utilize the intranasal route of vaccine administration. There are several reasons why intranasal vaccine administration may be more beneficial: 1) Intranasal vaccine administration alleviates concerns that injections pose for Beef Quality Assurance programs. 2) Intranasal vaccine administration may be less stressful on the animal. 3) Intranasal vaccine administration delivers the vaccine to the site of infection in the case of respiratory pathogens, and may provide a different adaptive immune response to the vaccine.

The objective of this study was to determine the effects of route of administration of the *Mannheimia haemolytica* and *Pasteurella multocida* fractions of the vaccine regimen on receiving cattle growth performance, health, and mortality.

Key words: intranasal vaccine, health, stocker

Experimental Procedures

A total of 388 cross-bred heifers (497 ± 32 lb) were purchased from sale barns in MO and TN and received in 4 truckloads to the Kansas State University Beef Stocker Unit. Two truckloads were received on March 23, one truckload was received on March 30, and one truckload was received on April 2, 2016. Cattle were weighed immediately after coming off the truck, individually identified with an ear tag, and an ear notch sample was taken for testing of persistent infection with Bovine Viral Diarrhea Virus. Three animals tested positive and were excluded from the experiment. Other exclusion criteria

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included the presence of active disease, injury, or disparities in body weight relative to the other animals from the truckload.

The day following arrival, all cattle were weighed again and given their respective investigational vaccines and Vision 7 Somnus (Merck Animal Health, Madison, NJ), Ivomec Plus (Merial, Duluth, GA), Safe-Guard (Merck Animal Health, Madison, NJ) and Exede (Zoetis, Parsippany, NJ). This weight served as the initial weight for the experiment.

Truckload served as the blocking factor and cattle within a truckload were stratified by arrival weight and randomly assigned to pens of 11 to 13 head. Pens were then randomly assigned to one of 2 treatments with 16 pens per treatment. Treatments consisted of Vista Once SQ (Merck Animal Health, Madison, NJ) given subcutaneously at initial processing or Vista 5 SQ (Merck Animal Health, Madison, NJ) given subcutaneously plus Once PMH IN (Merck Animal Health, Madison, NJ) administered intranasally at initial processing.

Diets were provided in quantities to ensure *ad libitum* intake. Body weights were captured at initial processing, during revaccination (day 14), and at completion of the study, which was day 47 for blocks 1 and 2 and day 45 for blocks 3 and 4. All calves were observed daily for any signs of sickness or lameness. If any signs were observed, cattle were pulled from their pens and a rectal temperature was taken. If a temperature of 104°F or higher was found, antibiotics were administered according to the Kansas State University Beef Stocker Unit health protocol. Diagnosis of non-bovine respiratory diseases (lameness, pink eye, etc.) was treated according to the health protocol.

During the course of the trial, 1 animal from the Vista Once SQ group was found dead in the pen from bronchopneumonia. Additionally, 4 heifers were removed for mycoplasma infections or injury. Of these animals, 2 were in the Vista Once SQ group and 2 were in the Vista 5 SQ plus Once PMH IN group. These animals were excluded from the analysis. Data were analyzed as a randomized complete block design using the MIXED procedure of SAS (version 9.3; SAS Institute, Cary, NC). Pen was the experimental unit. In the model, treatment was a fixed effect and block was a random effect. Treatment differences were considered significant at P-value less than 0.05 and tendencies at P-value less than 0.10.

Results and Discussion

The effects of route of vaccine administration are shown in Table 1. Overall, the cattle performed well on feed between all treatments. There were no differences in body weight gain, average daily gain, feed intake, feed efficiency, morbidity, or mortality during the receiving trial. Morbidity and mortality were lower than anticipated in this class of cattle.

Implications

Route of vaccine administration in cattle experiencing a low disease challenge did not impact performance or health measurements.

Table 1. Performance and health of cattle vaccinated with VISTA Once SQ given subcutaneously or VISTA 5 SQ given subcutaneously together with ONCE PMH-IN administered intranasally

Item	Vista 5 SQ and Once PMH IN	Vista Once SQ	SEM ¹	P-value
Initial weight, lb	498	499	1.3	0.77
14-Day performance				
Body weight, lb	534	531	2.8	0.39
Dry matter intake, lb	10.8	11.0	0.13	0.36
Average daily gain, lb	2.53	2.32	0.196	0.29
Gain:feed	0.232	0.212	0.0181	0.25
45-Day performance				
Final weight, lb	593	593	3.9	0.96
Dry matter intake, lb	11.9	12.0	0.13	0.50
Average daily gain, lb	2.06	2.05	0.083	0.83
Gain:feed	0.174	0.171	0.0069	0.66
Health				
1 st Pulls	4.1%	3.6%	0.17	0.73
2 nd Pulls	0.01%	0.01%	0.008	0.55
Mortality	0%	0.005%	0.0064	1.00

¹SEM=Standard error of the mean.