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Effects of vaccinating beef dams precalving and calves preweaning with a Pasteurella haemolytica vaccine

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EFFECTS OF VACCINATING BEEF DAMS PRECALVING AND CALVES PREWEANING WITH A *PASTEURELLA HAEMOLYTICA* VACCINE

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Summary

Our objective was to determine if vaccinating dams precalving and calves preweaning for *Pasteurella haemolytica* could effect serum antibody titers in dams, and the pre- and post-weaning health and performance of their calves. Vaccination increased serum antibody titers in multiparous cows, but not first-calf heifers. Precalving vaccination had minimal effects on mortality and morbidity of calves before or after weaning. Subsequent steer feedlot gains were unaffected by precalving and preweaning vaccinations and carcasses were not affected. However, heifers' weight gains were greater from weaning to one year of age when reared by vaccinated dams.

(Key Words: Passive Immunity, Vaccination, Antibody.)

Introduction

Pasteurella haemolytica is the major pathogen in bovine respiratory disease in weaned beef calves. Vaccination has proven effective in the prevention of *P. haemolytica* disease. However, little research has been done regarding the vaccine's role in preventing disease through passive immunity. Therefore, the objectives of our study were to determine:

- if *P. haemolytica* vaccine could increase serum antibody titers in beef cows
- if passive immunity would enhance disease resistance and increase calf performance
- if preweaning *P. haemolytica* calf vaccination in conjunction with maternal precalving treatments is effective.

Experimental Procedures

In January 1999, multiparous (n=233) beef cows and primiparous (n=47) heifers received an injection of *P. haemolytica* vaccine (VAC) or no injection (CON) three weeks prior to the start of the calving season. Blood samples were collected on the day of treatment to establish existing serum antibody titers. Three weeks post treatment, serum antibody titers were measured again to evaluate vaccine effectiveness. Titers were measured via enzyme-linked immunoassay. Calves were blocked statistically by cow treatment and randomly allotted to receive *P. haemolytica* vaccine (VAC2) or no injection (CON2) three weeks preweaning. Thus, calf treatment groups were VAC/VAC2, VAC/CON2, CON/VAC2, and CON/CON2. Calf health and performance were evaluated from birth to slaughter for steers and birth to one year of age for heifers. Steer carcass data and lung lesion scores were collected.

Results and Discussion

VAC multiparous cows (Figure 1) had a greater titer response than their non-vaccinated counterparts ($P<0.05$). However, the primiparous heifers did not respond to vaccination ($P>0.13$). Because primiparous cows were naive to *P. haemolytica*, this could have jeopardized their ability to significantly increase serum titers.

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No differences (P>0.64) in calf preweaning or postweaning illness or gain were recognized. Steers were weaned and placed into feedlot pens at the Western Kansas Agricultural Research Center, Hays. Two slaughter dates were used to optimize feedlot performance and carcass traits. Steers averaged 469 ± 25 days of age and weighed 1320 ± 104 lb at slaughter. Feedlot gains were not effected by dam or calf vaccination (P>0.48). There were no treatment differences in dressing percent, yield grade, marbling score, or back fat (P>0.23). There were also no differences in number of lung lesions (P>0.51). However, heifers from VAC dams had greater had greater (P<0.05) total postweaning weight gain (39.5 lb) than heifers from CON dams. Most of the weight gain advantage occurred during the second month after weaning (P<0.05). Calf vaccination had no effect on heifer performance (P>0.16).

Our data indicate that *P. haemolytica* vaccine increased serum antibody titers in multiparous cows, but not in primiparous heifers. However, vaccination of calves had little effect on their health status and performance, which could be attributed to the low level of illness observed throughout the study. Perhaps under conditions of stressors, such as commingling, transportation, and dietary changes, vaccine effects would be recognized.

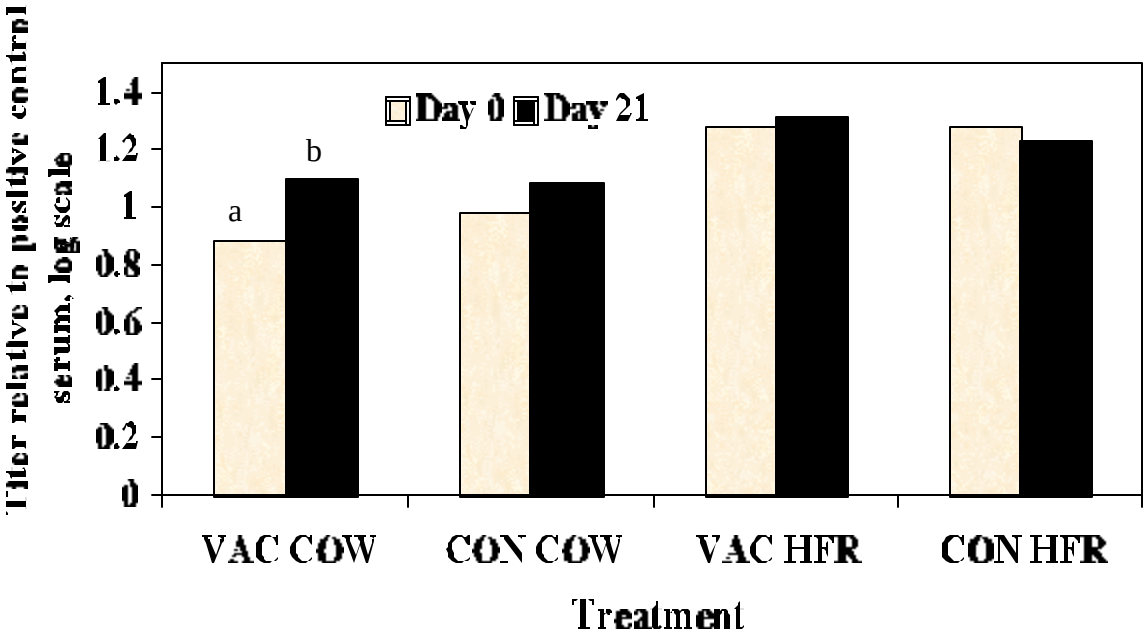

Figure 1. Serum Antibody Titers for Maternal Treatment Groups.
a,b indicate statistical differences (P<0.05).