BEEF CATTLE RESEARCH UPDATE

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Effects of Vaccination Timing on Performance, Antibody Response, and Health in Feedlot Cattle

The bovine respiratory disease (BRD) complex is the most is the most devastating health problem of the beef industry.[1, 2] It is the primary cause of morbidity (70%–80%) and mortality (40%–50%) in feedlots in the United States and continues to contribute to substantial losses in feedlot performance, health, and carcass quality.[3] A 2011 USDA survey of U.S. feedlots with a capacity of 1,000 or more head indicated that most feedlots vaccinated cattle and that the most common vaccinations administered were for the prevention of BRD.[4] As a percentage of all feedlots, 96.6% vaccinated for bovine viral diarrhea and 93.7% vaccinated for infectious bovine rhinotracheitis (IBR), while 89.1% vaccinated for bovine respiratory syncytial virus and 85.1% vaccinated for parainfluenza-3 virus. It is widely accepted that vaccination of healthy calves for respiratory pathogens is important for preventing BRD and maintaining optimal calf health. Hence, most feedlot receiving protocols include vaccination against BRD viruses for high-risk cattle within 48 hours of arrival. However, research suggest that vaccine efficacy is reduced when administered to highly stressed animals since immune function can temporarily be compromised. Weaning, marketing, and shipment of feeder cattle to feedlots are major stressors to cattle.[5] For these reasons, altering the time of vaccination against BRD has been investigated as an approach to enhance vaccine efficacy, immunity to BRD, and performance in feedlot cattle.

Recent Oregon State University research compared the impacts of advancing, delaying, or vaccinating against BRD at the time of weaning and feedlot entry on serum antibody titers against BRD pathogens, health responses, and performance of cattle managed in commercial feedyards until slaughter.[6] In this study, 159 Angus × Hereford calves were assigned to one of three vaccination schemes against BRD: 1) vaccination at weaning (day 0) and revaccination at feedyard arrival (day 30; CONTROL), 2) vaccination 15 days before weaning (day −15) and revaccination 15 days before feedyard arrival (day 15; EARLY), and 3) vaccination 15 days after weaning (day 15) and revaccination 15 days after feedyard arrival (day 45; DELAYED). The calves were maintained on pasture from days −15 to 29, transported (day 30) for 298 miles to a commercial growing feedyard, and moved (day 180) to an adjacent finishing yard where they remained until slaughter (day 306).

These researchers reported that no treatment effects were detected ($P \geq 0.48$) for body weight and average daily gain during the experimental period. As such, no treatment differences were detected ($P \geq 0.29$) on carcass characteristics upon slaughter. However, early vaccination resulted in greater serum titers and thus immune protection against BRD viruses at feedlot entry (day 30 of the experiment). In contrast, delayed vaccination cattle were those with less immunity to BRD viruses during the initial 15 days in the growing lot, which increased once they were revaccinated. As a result of these changes in immunity, overall BRD incidence during the experimental period was less ($P = 0.04$) in EARLY vs. CONTROL and DELAYED (16.9 vs. 32.1% and 32.1% of cattle diagnosed with BRD, respectively, and similar ($P = 0.99$) between CONTROL and DELAYED.

However, the ability of cattle diagnosed with BRD to recover from the disease was not impacted by vaccination strategy, despite treatment differences noted for serum antibody titers and BRD incidence. Incidence of cattle that required ≥2 antimicrobial treatments (29.4, 23.5, and 22.2%), number of antimicrobial treatments required upon BRD diagnosis (1.29, 1.35, and 1.33), and mortality rates (5.5, 3.8, and 3.8%) were similar among vaccination strategies, respectively, for

CONTROL, DELAYED, and EARLY. Indeed, BRD vaccines are mostly expected to prevent and control the disease, but not hasten recovery in sick animals.[2]

These authors concluded that EARLY vaccination increased serum titers against BRD viruses at feedlot entry, and alleviated the incidence of BRD during the entire feeding period compared with CONTRO and DELAYED. Thus, “advancing the time of vaccination against BRD pathogens to provide both doses prior to feedlot entry appears to be a valid strategy to enhance immunocompetence and alleviate BRD in feedlot cattle”

LITERATURE CITED

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