
Abstract: The objective of this study was to evaluate whether prenatal transportation stress (PNS) affects the immune response of Brahman calves after vaccination against Bovine Viral Diarrhea Virus (BVDV). Mature Brahman cows inseminated to a single Brahman sire in 2018 were assigned to either Control (n=35; not transported) or PNS (n=37; 2h of transportation at 60, 80, 100, 120, and 140±5d of gestation). Of the calves born in 2019, 11 Control and 12 PNS calves were studied for vaccine treatment (VAX). Temperament score, body weight, and blood samples were obtained from calves prior to weaning (D-28), prior to first BoviShield vaccine (D+35), and after second BoviShield vaccine (D+98). Serum cortisol was determined by RIA. Humoral immune response was evaluated by virus neutralization (VN) assays using serum collected at respective timepoints post-vaccination. Cell-mediated immune (CMI) response was evaluated using a novel PrimeFlow RNA assay that incorporates cell surface marker staining with intracellular RNA expression of cytokines on blood samples obtained at D+35 and D+98. Data were analyzed using GLM procedures of SAS. Only total WBC and absolute lymphocytes were increased with PNS (P<0.05), while lymphocytes were also decreased with VAX (P<0.05). There was no PNS effect on the VN or CMI results, serum cortisol concentration, or temperament score. VAX tended (P=0.06) to reduce serum cortisol, as well as resulted in an increase in VN titers (P<0.01) and frequency of interferon-γ mRNA expression in the CD4+ population (P<0.01), but not in CD25+ population (P=0.26). Interaction between sampling day and VAX resulted in more drastic increase (P<0.05) from D+35 to D+98 in VN titers, CD4+ population frequency of interferon-γ mRNA expression, and CD25+ population mean fluorescent intensity. Vaccine treatment positively affected humoral and cell-mediated immune responses; however, prenatal transportation stress did not negatively impact response of Brahman calves to immunization against BVDV.

Keywords: Brahman calves, immunity, stress


Abstract: Fixed-time artificial insemination (FTAI) provides a practical and feasible option for commercial and stud breeders to implement AI into their herds, as 100% of the herd can be inseminated at a predetermined time. FTAI can suit many herds, whether they are inseminating small numbers or the whole herd. We investigated the effects of sire and inseminator on pregnancy and birth outcomes following FTAI of Angus cows. Three Angus sires; namely GAR Quantum 7AN560, square B True North 8052, and Tehama Tahoe B767, and two inseminators (1 and 2) were evaluated for differences in pregnancy outcomes and birth rates from 24 inseminations. Angus cows (N = 24) were synchronized with CIDR plus GnRH injection. After 7 days, CIDR was removed and each cow received 25 mg PGF2α. AI was conducted within 72 h from PGF2α injection. Cows were randomly assigned for AI between inseminators (12 cows inseminated by inseminator 1 and 12 cows by inseminator 2) and sires (6, 8, and 10 cows were inseminated by GAR Quantum, Tehama Tahoe, and True North sires, respectively. Pregnancy was diagnosed at 4-5 months after AI by transrectal ultrasonography. Percentage of re-cycling cows 21 days after AI was 45.8% (11/24). Pregnancy rate was 54.2% (13/24). Pregnancy rate was higher (P<0.05) for cows inseminated by inseminator 1 than by inseminator 2 (69.2% vs. 30.8%). The average age of pregnancy was 5.6 ± 0.2 months. Among sires, 46.2% (6/13) of the pregnant cows were inseminated by True North, 38.5% (5/13) by Tehama Tahoe, and 15.4% (2/13) by GAR Quantum. The pregnant cows gave birth to healthy calves at 280.8 ± 2.1 days after AI. In conclusion, both inseminator and sire affected the pregnancy rates and birth outcomes after AI in beef cattle. This study was conducted to support the establishment of a purebred Black Angus beef herd at FVSU with the application of AI.

Keywords: artificial insemination, beef cattle, sire