Associations between bovine leukemia virus status and fertility in Kansas beef herds: A cross-sectional study

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Introduction

Bovine leukemia virus (BLV), an oncogenic retrovirus of the genus Deltaretrovirus, infects bovine lymphocytes and is the etiologic agent of bovine leukosis. The objective of this study was to test the association between BLV status when classified by 3 different methods (ELISA, qPCR, and proviral load (PVL)) with fertility of beef cattle.

Materials and Methods

For this study, a convenience sample of 2,820 cows from 43 beef herds located across 13 counties in Eastern Kansas was evaluated for BLV-status and pregnancy-status. A herd was defined as a group of cows managed as a unit through the grazing season, and the 43 herds were nested in 19 ranches (i.e. 1 to 6 herds per ranch). Pregnancy-status was determined by uterine palpation or ultrasonic examination. BLV-serostatus was determined using an ELISA antibody test (gp-51; IDEXX). BLV qPCR-status and PVL were determined utilizing a qPCR test (SS1 qPCR test; CentralStar Laboratories). The association of BLV-status, with the probability of becoming pregnant was evaluated with logistic regression analyses that used pregnancy-status as a binary outcome, herd nested within ranch as a random effect, and BLV-status (ELISA-, qPCR-, and PVL-status as separate models), age-category, and BCS-category as fixed effects.

Results

Evaluation of the raw data revealed that 55% of cows (1,552/2,820) were classified as BLV-positive by ELISA. The model-adjusted probability of becoming pregnant during the breeding season was statistically significantly associated with BLV ELISA-status (mean (SE): ELISA-positive = 92.0% (0.05); ELISA-negative = 88.3% (0.07); $P = 0.04$), age-category ($P = 0.05$), and BCS-category ($P = < 0.01$). The model-adjusted probability of becoming pregnant during the breeding season was not significantly associated with BLV qPCR-status ($P = 0.13$) or with BLV PVL-status ($P = 0.86$). The model-adjusted probability of being classified as becoming pregnant in the first 21 days of the breeding season was not statistically significantly associated with any of the 3 methods for classifying BLV status.

Significance

The results of this cross-sectional study of 43 beef cow-calf herds found that although being classified as BLV ELISA-positive was associated with higher probability of being pregnant, the other methods of BLV-status classification did not provide evidence of an association. Similarly, none of the methods to classify BLV-status were associated with the probability of being classified as becoming pregnant in the first 21 days of the breeding season.