A survey of herd-level risk factors for bovine respiratory disease (BRD) in nursing beef calves

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Introduction

Surveys by the USDA confirm that bovine respiratory disease (BRD) is the leading cause of death of nursing (preweaned) beef calves three weeks of age and older. Management modifications decrease BRD in some cattle populations; however, management-related risk factors for BRD in nursing calves are poorly characterized, making it difficult to develop evidence-based control measures.

Materials and Methods

The objective of this study was to survey cow-calf producers to determine herd-level risk factors for BRD in nursing calves. A cross-sectional survey of 2,600 randomly selected cow-calf producers in three Eastern and three Plains states was undertaken, with herds selected from the National Agricultural Statistics Service database. Herds were stratified by state and size, and stratum-specific sample sizes were determined by proportional allocation. Questionnaires were mailed in August 2011, requesting information regarding herd management for the 2010 calving season. Survey logistic regression was used to evaluate the association of herd characteristics with the herd-level probability of observing calf BRD. A survey zero-inflated negative binomial (ZINB) model was used to evaluate the association of herd characteristics with the cumulative incidence of treatment for calf BRD. Associations in the final models with $P \leq 0.05$ were considered significant.

Results

Questionnaires were returned by 873 (33.6%) herds. Of these 873 herds, 463 (53.1%) had calves born in 2010, and 459 (52.6%) provided information about calf BRD. Of the responses 48% came from Plains herds and 52% came from Eastern herds. Mean ± SE herd size was 102 ± 12 cows for Plains herds and 48 ± 4 cows for Eastern herds. Mean ± SE number of calves weaned was 94 ± 12 for Plains herds and 37 ± 3 for Eastern herds. Twenty-one percent of operations reported observing one or more calves with BRD. Of these, 89.2% treated one or more calves for BRD and 46.4% reported one or more calf deaths due to BRD. In the multivariable model, calf BRD was significantly associated with larger herd size, occurrence of respiratory disease in cows, occurrence of diarrhea in calves, and length of calving season. For Plains but not Eastern herds, the odds of observing calf BRD were lower in herds with a calving season shorter than three months. In the ZINB model, cumulative incidence of treatment for calf BRD was negatively associated with larger herd size and checking cows for pregnancy and positively associated with winter calving, bringing calves into the herd from outside sources, giving nursing calves supplemental feed, and using a heat synchronization program. Thus, while larger herds were more likely to observe calf BRD, a smaller proportion of calves were treated for BRD in larger herds.

Significance

Although further research will need to confirm the results of this survey, the results suggest targets for management modifications that could limit calf BRD.