

# Rumination and activity in Angus and Angus-cross beef calves: Influence of sex, breed, backgrounding diet and oropharyngeal intubation

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## Introduction

Rumination and activity behavior are important indices for monitoring the welfare and health status of beef cattle. Stress, excitement, diseases and management procedures can alter rumination and activity pattern of beef cattle. The beef cattle backgrounding phase allows producers to feed a variety of forage to improve growth performance before calves enter the feedlot. The objectives of this study were to evaluate 1) the influence of sex, breed, oropharyngeal intubation and backgrounding diet on rumination and activity pattern in Angus and Angus-cross beef calves; and 2) the daily variation of rumination and activity in Angus and Angus-cross beef calves under different backgrounding systems. We hypothesized that rumination and activity pattern would differ according to time of day, calf sex, breed, oropharyngeal intubation and backgrounding diet.

## Materials and methods

A total of 62 ( $n = 62$ ) freshly weaned calves were vaccinated and randomly stratified by sex (heifers and steers), breed (Angus and Angus  $\times$  Simmental cross) and assigned randomly to 1 of 3 backgrounding treatments for 55 d: 1) a high-roughage diet delivered in a bunk within a feedlot (dry lot; DL); 2) perennial pasture vegetation within rotational paddocks (perennial pasture; PP); or 3) summer annual cover crop within a strip plot (cover crop; CC). On d 56, cattle were commonly placed into the feedlot located at the same premises and delivered the same energy diet until harvest. The frequency/number of rumination and activity were monitored bihourly for 48 hours from 0:00 h to 48:00 h (GMT + 1) using ear tag activity monitor (SCR eSense, Allflex, Irving, TX, USA). Data obtained were expressed as mean  $\pm$  standard error of the mean (mean  $\pm$  SEM). Nonlinear regression analysis was used to determine the daily rhythm in rumination and activity of calves. Independent t-test was used to determine the effect of sex, breed and intubation on rumination and activity. One-way analysis of variance (ANOVA) followed by Tukey's post-hoc test was used to compare the effect of background diet on rumination and activity. Data was analyzed using GraphPad prism software, version 6.01, for Windows (GraphPad Software, San Diego, CA) ([www.graphpad.com](http://www.graphpad.com)).

## Results

Application of nonlinear regression using cosine wave showed that rumination and activity exhibited daily rhythmicity in Angus and Angus-cross beef calves. The highest/peak values for rumination and activity in heifers, steers, Angus, Angus  $\times$  Simmental cross and intubated calves occurred during the dark and light phase of the dark/light cycle, respectively. Beef calves backgrounded on CC had a higher ( $P < 0.05$ ) rumination ( $45.33 \pm 1.57$ ) compared with calves backgrounded on PP ( $43.96 \pm 1.47$ ) and DL ( $44.45 \pm 1.59$ ) diet. Similarly, DL calves ( $24.16 \pm 0.68$ ) had higher ( $P < 0.05$ ) activity compared to CC ( $23.78 \pm 0.72$ ) and PP ( $23.49 \pm 0.72$ ). The results showed that sex, breed and intubation did not influence rumination and activity of Angus and Angus-cross beef calves during the study period.

## Significance

We concluded that time of the day and backgrounding diet influenced rumination and activity pattern of Angus and Angus-cross beef calves. In addition, sex, breed and oropharyngeal intubation did not influence rumination and activity behavior of Angus and Angus-cross beef calves. Clinical interpretation of rumination and activity pattern in beef cattle should be done considering the time-of-day data was collected and backgrounding diet type.

