

# Using CowManager<sup>®</sup> to Understand Behavioral and Physiological Differences in Beef Cattle During Weaning



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## INTRODUCTION

The Northwest Georgia Research and Education Center (NWREC) is the location of an ongoing research project entitled, “The Impact of Selection Using RADG EPD on Reproductive Performance, Growth Performance, and Carcass Traits in Angus Cattle”. This commercial Angus research herd consists of 220 mature cows and subsequent progeny. The herd yields 50% or greater progeny through artificial insemination. The resulting heifers are retained as project replacements. Terminal progeny are fed with resulting feed efficiency and carcass data obtained. The NWREC also uses the CowManager<sup>®</sup> System, which is a tag-based sensor system to electronically record animal movement. This movement activity is also how the system algorithmically calculates eating time, rumination time and estrus activity. Mature cows and their calves wear the sensors over their electronic identification tag (EID). The objectives of this study are twofold. The first objective was to observe differences in cattle managed under two weaning environments. The second objective was to better understand the CowManager<sup>®</sup> System’s ability to be used in beef cattle research,

## MATERIALS & METHODS

CowManager<sup>®</sup> sensors were applied to heifer calves (n=63) 30 days prior to weaning and steers (n=27) at weaning. Sensors were applied to heifers to gather information for pubertal status in another project. Upon weaning, steers and heifers with sensors were block randomized by weight, sex and genetic type into treatment groups. The CowManager<sup>®</sup> sensor tags recorded eating time, rumination, active time (normal activity), high activity and non-active times for each animal unit. CowManager<sup>®</sup> records activity which is categorized and used in the algorithms to identify potential sickness and estrus activity. All calves belong to one of four genetic types based on targeted matings in another ongoing research project. The genetic types are: 1) Low RADG x Average Marbling (LA); 2) Low RADG x High Marbling (LH); 3) High RADG x Average Marbling (HA); and 4) High RADG x High Marbling (HH). Heifers and steers wearing CowManager<sup>®</sup> sensors had known birth dates and sires. All calves were sired by 1 of 8 Angus bulls. Bulls are selected with minimum and maximum EPDs for RADG and marbling to produce the resulting genetic types. Total calves at the NWREC (n=219, project and non-project) were blocked by weight and randomized into two weaning management groups: barn weaned or pasture weaned. Barn weaned (Barn) calves were continuously housed for 14 days and fed a commodity mixed ration of pelleted soy hulls and corn gluten along with free choice hay. Dams of Barn calves had access to nose-to-nose contact with calves on the perimeter of the barn (Figure 1). Pasture weaned calves (Pasture) were allowed access to 15 acres of pasture and fed the commodity ration inside the barn with free access to enter and exit. Free choice hay was available. Dams of pasture calves had access to nose-to-nose contact along a woven wire pasture fence (Figure 1). Both Pasture and Barn calves received booster vaccinations for Clostridial and respiratory disease 7 post weaning.

## RESULTS & DISCUSSION

CowManager<sup>®</sup> activity for eating, ruminating and inactive time were shown to have significant variation ( $P < 0.01$ ) based on day (Figure 2). Natural variation in weather patterns and moving cattle from one pasture to another are possible reasons for this observation. During the 22 days of CowManager<sup>®</sup> recorded activity pre-weaning, High RADG heifers spent an average of 390 minutes eating, while Low RADG heifers spent an average eating time of 334 minutes per day ( $P=0.001$ ; Figure 3). In addition, there was a trend for High RADG heifers to spend more time ruminating with an average of 341 minutes a day versus 314 minutes for Low RADG heifers ( $P=0.17$ ). There were no significant differences found between High or Low RADG heifers pre-weaning for inactive time ( $P=0.48$ ). When evaluating CowManager<sup>®</sup> activity based on genetics for marbling, there were no significant differences found before weaning ( $P \geq 0.23$ ). Still, high marbling calves recorded numerically higher eating time (369 vs. 354 minutes;  $P=0.32$ ), rumination times (339 vs. 316 minutes;  $P=0.23$ ), and inactive time (391 vs. 385 minutes;  $P=0.65$ ). There was no significant difference ( $P=0.40$ ) found between growth performance in Barn versus Pasture calves 22 days post-weaning. Additionally, there was also no significant difference in growth performance for High ( $P=0.49$ ) and Low RADG ( $P=0.44$ ) or sex ( $P=0.43$ ). During the post weaning period, the CowManager<sup>®</sup> system recorded numerically higher eating times for high marbling calves, although not statistically significant ( $P=0.33$ ). However, CowManager<sup>®</sup> reported rumination time was significantly higher ( $P < 0.05$ ) for high marbling versus low marbling calves (Figure 5). High marbling calves also tended to spend more inactive time during the post weaning period ( $P=0.12$ ). Though not significant ( $P=0.42$ ), High RADG calves tended to spend more time eating with 279 min/d versus 272 min/d. Trends for post weaning time spent ruminating were similar as High vs. Low RADG were not significantly different ( $P=0.64$ ) but were numerically higher, 270 min/d vs. 260 min/d. CowManager<sup>®</sup> showed that inactive times tended to be higher ( $P=0.07$ ) with High RADG calves, which recorded an average inactive time of 485 minutes, compared to 459 minutes for Low RADG calves (Figure 6). Barn and Pasture calves exhibited no differences in performance or health. The CowManager<sup>®</sup> data recorded in this study suggests that selection for various carcass traits and performance traits such as RADG do impact an animal’s physiological behavior. Still, some observations did not carry over from pre-weaning to post weaning and visa-versa. High RADG heifers exhibited greater eating time pre-weaning, but this did not carry forward as statistically significant in the post weaning RADG group of combined steers and heifers. Furthermore, inactive times for high RADG calves tended to be higher post weaning but not pre-weaning. The CowManager<sup>®</sup> system is not yet fully validated for use in beef cattle research but does show promise in the ability for technology to record animal behavior in a real time production setting.

