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Impact of Temperament and Human Acclimation on Measures of Performance and Reproduction in Beef Cows and Heifers

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Introduction

In beef cattle production systems, the word temperament is used to describe the fear-related responses of cattle to human interaction. Cattle may display poor temperament for a variety of reasons, some of which may include; 1) genetic disposition, 2) previous handling experiences, or 3) fear of a new or novel occurrence or interaction. For reasons related to animal well-being and human safety, improvements in cattle temperament have been sought through improved handling and management protocols and selective breeding. More recently, cattle producers have begun to recognize an association between cattle temperament and growth, carcass quality, and reproductive performance. This article will review two recent studies¹ conducted at the Range Cattle REC focused on the effects of acclimation procedures on productivity of developing heifers and mature cows. Our hypothesis was that human acclimation procedures would improve temperament score, reduce physiological measures of stress, and enhance reproductive performance. For a full report of these data, please contact the authors or refer to the publications listed.

Experiment 1: Effects of acclimation to handling on measures of growth and performance of Brahman-crossbred heifers

Overview

The objective of this study was to evaluate the effect of acclimation to handling through a cattle working facility on measures of growth, puberty attainment, and pregnancy in developing heifers. The study was conducted over two consecutive years and with 40 heifers enrolled each year. Heifers were weaned at approximately 7 months of age and randomly assigned to be acclimated or not (Control). The acclimation procedure involved handling the heifers 3 times weekly (Monday, Wednesday, and Friday)

¹Cooke, R.F., J.D. Arthington, D.B. Araujo, and G.C. Lamb. 2009. Effect of acclimation to human interaction on performance, temperament, physiological responses, and pregnancy rates of Brahman-crossbred cows. *J. Anim. Sci.* 87:4125-4132.

²Cooke, R.F., J.D. Arthington, B.R. Austin, and J.V. Yelich. 2009. Effects of acclimation to handling on performance, reproductive, and physiological responses of Brahman-crossbred heifers. *J. Anim. Sci.* 87:3403-3412.

for 4 weeks. Specifically, the heifers were walked from their pasture to the cattle working facility (1.25 miles round-trip). In week 1, the heifers were not restrained, but simply allowed to walk through the chute and back to the pasture. In subsequent weeks, they were restrained in the squeeze chute with gradually increasing time intervals (5 and 30 seconds for weeks 1 to 4, respectively). The timeline of the study was; 1) weaning (day 0), acclimation procedure (day 11 to 39), and breeding season (day 131 to 191). Heifer temperament was assessed on day 10 and 40, and blood was sampled throughout the study for assessment of puberty attainment and measurement of stress proteins.

Results

Heifers receiving the acclimation procedure gained 0.18 lb/day less over the entire study compared to Control heifers (Table 1). We attributed this difference to the added exercise and calories expended during the acclimation. For those heifers, this process involved a total walking distance of 15 miles. In addition, grazing was interrupted during each acclimation when the heifers were removed from their pasture and walked to the cow pens. Although the acclimated heifers had less body weight gain, they also had lesser blood concentrations of cortisol, which is a protein produced in response to stress, suggesting that the acclimated heifers were experiencing a lesser amount of stress during the handling and sample collection procedure, compared to the Control heifers. Despite a reduced body weight gain, the acclimated heifers achieved puberty sooner (Figure 1) and became pregnant earlier in the breeding season compared to Control heifers.

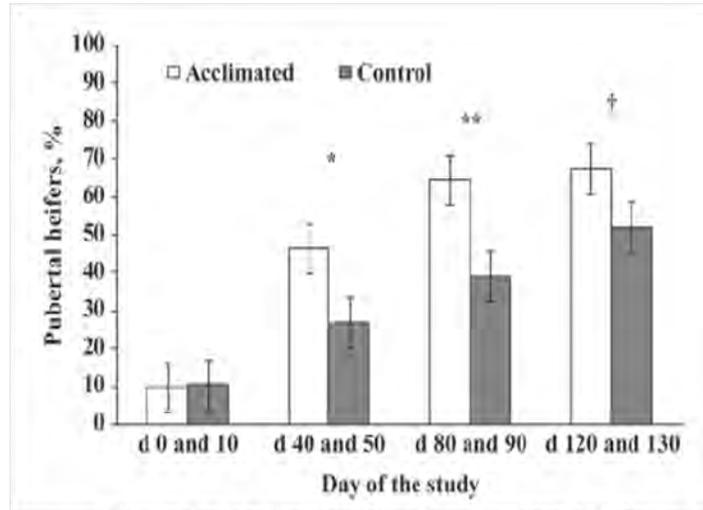


Figure 1. Attainment of puberty within 10-day intervals of beef heifers exposed or not (Control) to handling acclimation procedures; Experiment 1.

Table 1. Average daily gain (ADG), temperament score, and plasma cortisol concentrations of heifers exposed, or not, to an acclimation procedure.

Item	Acclimated	Control	SEM	P-value
ADG ¹ , lb/day	1.10	1.28	0.04	< 0.01
Temperament score ²	2.46	2.48	0.096	0.93
Plasma cortisol, ng/mL	38.5	51.0	3.5	< 0.01

¹Calculated over the entire 191 day study.

²Calculated from a pooled assessment of heifer behavior in the squeeze chute, velocity exiting the squeeze chute, and behavior in a pen with an observer present.

Implications

Acclimating pre-pubertal, Brahman-crossbred beef heifers to standard cattle working facilities and human presence may hasten the age of puberty and pregnancy attainment.

Experiment 2: Effects of acclimation to humans on measures of temperament and pregnancy of Brahman-crossbred cows

Overview

The objective of this study was to determine if temperament and pregnancy attainment could be improved in mature beef cows exposed to a human-presence acclimation procedure. This study was conducted over two consecutive years using a total of 395 cows assigned to 14 individual pastures. Two treatments (Acclimated and Non-acclimated (Control)) were randomly assigned to pastures (7 pastures/treatment annually). The acclimation procedure was applied from August to January, which was prior to and following the calving season (October to January). The procedure involved visiting the herds twice weekly and walking among the cows for 15 minutes/herd and offering small amounts (1 to 2 ounces) of cattle range cubes, which provided no meaningful nutritional contribution. The Control cows remained undisturbed.

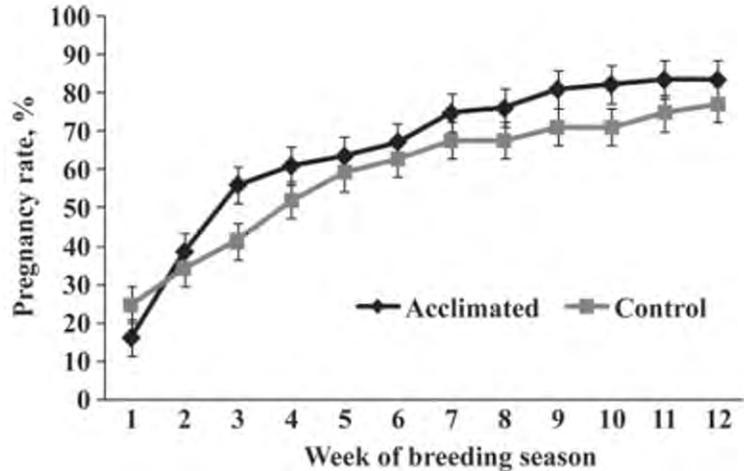


Figure 2. Attainment of pregnancy among Acclimated, or not (Control), cows in Experiment 2, Year 1, Braford cows only. The acclimation procedure involved walking among the cowherds three times weekly from August (weaning) to January (beginning of the breeding season) and hand-offering less than 0.5 kg of range cubes per cow.

Results

The acclimation procedures in Experiment 2 yielded no meaningful changes in cow body weight change, plasma cortisol concentrations, or temperament (Table 2). The impact of acclimation on cow pregnancy rate was inconsistent among years and breed. In general, there were no impacts of acclimation on pregnancy, with the exception of Braford cows in Year 1, when the acclimation procedure resulted in more Braford cows becoming pregnant earlier in the breeding season (Figure 2). Interestingly, although the acclimation procedure did not impact changes in temperament score among cows or the likelihood of pregnancy, there was a significant linear relationship among temperament score and pregnancy rate for all cows. Irrespective of acclimation treatment, cows with poorer temperament scores were less likely to become pregnant compared to cows with calmer temperaments (Figure 3).

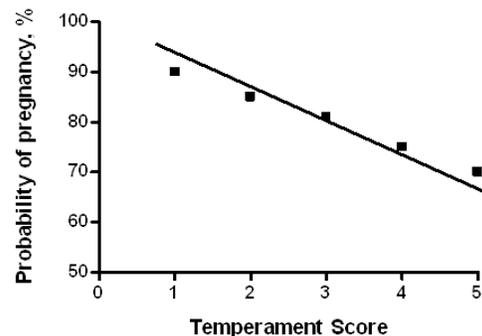


Figure 3. Effects of temperament score (1 = calm, 5 = highly excitable temperament), assessed at the beginning of the breeding season, on the probability of Brahman-crossbred cows (n = 395) to become pregnant. A linear effect was detected (P < 0.01). Adapted from Cooke et al., J. Anim. Sci. 2009. 87:4125).

Table 2. Cow body condition score change, temperament score, and plasma cortisol concentrations of cows exposed, or not, to an acclimation procedure.

Item	Acclimated	Control	SEM	P-value
BW change ¹ , lb	-95	-110	11.9	0.38
Temperament score ²	2.50	2.49	0.042	0.94
Plasma cortisol, <u>ng/mL</u>	33.3	33.6	1.2	0.88

¹Calculated difference from start of the breeding season (January) and beginning of the study (August).

²Calculated from a pooled assessment of heifer behavior in the squeeze chute, velocity exiting the squeeze chute, and behavior in a pen with an observer present.

Implications

Within the conditions of this study, acclimating mature Brahman-crossbred beef cows to human presence appears to have no impact on changes in cow temperament or the probability of pregnancy. However, an overall influence of cow temperament on attainment of pregnancy was discovered.

Summary

The role of temperament in measures of well-being and productivity of beef cattle is becoming better understood. The results of these two studies suggest that temperament has an important and measurable influence on the likelihood of achieving pregnancy in a controlled breeding season. The effectiveness of acclimation procedures appear to be age-dependent, in that they were effective in improving reproductive measurements in growing heifers, but not mature cows. Further research is warranted to investigate other methods of acclimation and further assess the impact of cow age on response to acclimation protocols.

This article was published previously at the Range Cattle Research and Education Center – Field Day, April 12, 2012. For additional information, please contact the Range Cattle Research and Education Center by telephone (863-735-1314) or email (ona@ifas.ufl.edu).