BEEF CATTLE RESEARCH UPDATE

Britt Hicks, Ph.D., PAS
Area Extension Livestock Specialist
Oklahoma Panhandle Research & Extension Center

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Effects of Cattle Temperament at Feedlot Arrival and Breed Type on Cattle Performance

Research has demonstrated that cattle with excitable temperaments have reduced performance, less favorable efficiency of gain, and leaner carcasses compared to calmer cattle.[1, 2, 3, 4] In addition. *Bos indicus* influenced cattle (Brahman) have been shown to have greater incidence of excitability than *Bos taurus* cattle.[2] Recent Texas A&M University research evaluated the effects of temperament at feedlot arrival and breed type on feedlot growth performance, feed efficiency, feeding behavior, and carcass characteristics and value in finishing beef heifers.[5]

This study utilized purebred Angus (63 head), Braford (116 head), Brangus (122 head), and Simbrah (110 head) heifers sourced from a single ranch (average initial body weight = 617 lb). Growth, feed intake, and feeding behavior data were collected during three trials that were conducted during consecutive years with breeds equally distributed across years. The heifers were fed a high-grain diet ad-libitum twice daily in pens equipped with electronic feed bunks and individual animal feed intake and feeding behavior data was collected daily for 70 days. Temperament was evaluated by measuring exit velocity upon feedlot arrival and on days 0 and 70 of each trial. Exit velocity was measured as the time to cover a fixed distance of ~6 feet upon exiting a squeeze chute using infrared sensors. Exit velocity data were transformed to relative EV (REV) as the difference of each animal's EV from the mean divided by the mean EV for each day. Ultrasound measurements of backfat thickness, intramuscular fat percentage, and ribeye area were collected on days 0 and 70 of each trial. For each trial, heifers were slaughtered in 2 groups that were 4 to 6 weeks apart when they reached a targeted backfat thickness of approximately 0.55 inches. As a measure of tenderness, Warner-Bratzler shear (WBS) force was measured at 1- and 14-days postmortem aging.

These researchers reported that there were no significant differences among the four breeds evaluated in this study for initial or final REV. They speculated that the lack of breed effect on temperament in this study may reflect the relatively low proportion of Brahman inheritance in the American breeds used in this study.

The effects of temperament on feedlot performance and carcass characteristics are shown in Table 1. Calm heifers (mean REV minus 1 standard deviation) had 4.5 and 6.5% greater ($P < 0.001$) initial and final body weights (BW) than heifers with excitable temperaments (mean REV plus 1 standard deviation). Heifers with calm temperaments had 11.9% greater ($P < 0.001$) average daily gain (ADG) which was associated with a 7.9% greater ($P = 0.001$) dry matter intake (DMI) than heifers with excitable temperaments. As a result, calm heifers were 4.2% more efficient (greater Gain:Feed ratio, $P < 0.02$) than excitable heifers.

Carcasses from calm heifers were 4% heavier ($P < 0.05$) and had 4.3% greater ($P = 0.05$) backfat thickness, and tended to have 3.6% greater ($P = 0.07$) USDA yield grade than carcasses from excitable heifers. In addition, loin steaks from calm heifers had 7.6 and 6.6% lower WBS force ($P < 0.05$), respectively, at day 1 and day 14 postmortem aging than steaks from excitable heifers. Based on a carcass grid with discounts and premiums for hot carcass weight (HCW), quality grade, yield grade, and tenderness, calm heifers returned $62 more ($P < 0.01$) revenue per animal than excitable heifers.

In reference to feeding behavior, calm heifers had 9.4% greater meal duration ($P < 0.01$, 138.7 vs. 126.8 minutes per day), and consumed meals that were 21.9% longer ($P < 0.001$, 17.77 vs. 14.57 minutes per event), and 17.9% larger ($P < 0.001$, 2.91 vs. 2.47 lb per event) compared to excitable

heifers. In addition, calm heifers had 12.0% more bunk visits per meal (P < 0.001, 7.58 vs. 6.77) then excitable heifers.

Table 1. Effects of temperament on feedlot performance and carcass characteristics.[1]

Item	Calm	Excitable	P-value
Feedlot Performance			
Initial BW, lb	617	591	0.001
Final BW, lb	863	811	0.001
ADG, lb/day	3.53	3.15	0.001
DMI, lb/day	20.75	19.23	0.001
Gain:Feed	0.172	0.165	0.02
Carcass Characteristics			
HCW, lb	637	613	0.001
Backfat Thickness, in.	0.48	0.46	0.05
Ribeye Area, sq. in.	11.63	11.43	0.09
USDA Yield Grade	2.86	2.76	0.07
Marbling[2]	450	439	0.17
USDA Quality Grade[3]	408	402	0.15
WBS force (1 day), lb	7.54	8.16	0.002
WBS force (14 days), lb	4.96	5.31	0.003
Carcass Value			
Value, $/lb[4]	2.12	2.10	0.08
Income, $/animal	1,354	1,292	0.001

[1]Calm and excitable temperament means were computed at mean initial REV minus and plus 1 standard deviation, respectively.
[2]300 = Slight^{00}; 400 = Small^{00}; 500 = Modest^{00}; 600 = Moderate^{00}.
[3]300 = Select^{00}; 400 = Choice^{00}; 500 = Prime^{00}.
[4]Grid was based on 3-yearr average premiums and discounts for carcass weight, and USDA yield grade and quality grade with additional premiums or discounts for tenderness.
Adapted from Olson et al., 2019.

These authors concluded that “these results demonstrate that heifers with divergent phenotypes for temperament on feedlot arrival differ in their performance, feed efficiency, and feeding behavior patterns, as well as carcass quality and revenue”. They also concluded that “further research is warranted to investigate the use of management systems that sort and manage feeder calves based on feedlot-arrival temperament to reduce variation in growth efficiency and carcass quality, thereby improving predictability of feedlot performance and consistency of beef quality”.

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[3] Brown, E. G., G. E. Carstens, J. T. Fox, M. B. White, T. W. Welsh, Jr., R. D. Randel, and J. W. Holloway. 2004. Relationships between temperament and performance traits of growing calves. 2004 Beef Cattle Research in Texas.

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[5] Olson, C. A., G. E. Carstens, A. D. Herring, D. S. Hale, W. C. Kayser, and R. K. Miller. 2019. Effects of temperament at feedlot arrival and breed type on growth efficiency, feeding behavior, and carcass value in finishing heifers. J. Anim. Sci. 97:1828-1839.