

Relationships between animal temperament and growth performance, feeding behavior, and carcass characteristics in feedlot steers

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This project evaluated temperament, feeding behavior, feedlot performance and carcass characteristics in feedlot cattle. Temperament traits were measured to determine if temperament has an impact on feeding behavior, performance and carcass characteristics. Our research indicates that temperament did not have any significant correlation with feeding behavior or growth performance, but did have significant correlations with certain carcass characteristics..

Summary

Carcass characteristics and performance on feed are important to successful feedlot operations. Temperament in feedlot cattle has been shown to have an effect on feedlot performance as well as carcass qualities. Commercial beef steers (n = 113) were used to evaluate the relationship of temperament on feeding behavior, performance and carcass quality. All steers were fed a common growing and finishing diet. Every 28 days, steers were processed through the handling facilities, where exit velocity was recorded. Feeding behavior and feedlot performance traits were monitored throughout the study, and carcass characteristics were collected at slaughter. All statistical analyses were conducted using the correlation procedures of SAS (SAS Ins. Inc., Cary, N.C.). Exit velocity was shown to have a negative correlation with hot carcass weight (HCW; $P = 0.002$) and marbling ($P < 0.001$). The analyses also indicated a tendency for a negative correlation between exit velocity and yield grade (YG; $P = 0.07$).

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Introduction

Temperament in cattle is an important issue in the cattle industry. Voisinet et al. (1997) demonstrated that feedlot cattle with calm temperaments had higher average daily gain (ADG) than cattle with excitable temperaments, and that selection for calmer cattle could help maximize production efficiencies in feedlots.

Easily excitable cattle are potentially dangerous to themselves and personnel handling them. Also, research has shown that excitable cattle tend to have lower-quality carcasses than calmer cattle (Voisinet et al. 1997; King et al. 2006). The objectives of this research were to investigate if temperament, measured by exit velocity, is correlated with feeding behavior, growth performance and carcass characteristics.

Experimental Procedures

Animal care and use was approved by the Institutional Animal Care and Use Committee at North Dakota State University, Fargo. Commercial beef steers (n = 113, body weight [BW] = 804.9 ± 56 pounds) were purchased through

an order buyer in North Dakota and randomly assigned to four pens. Individual feed intake and feeding behavior data were collected using the Insentec Roughage Feeders (Insentec; Insentec B.V. Repelweg 10, 8316 PV Marknesse, The Netherlands) at NDSU's Beef Cattle Research Complex.

Insentec Roughage Feeders measures feed intake and time of each visit, dry-matter intake (DMI), time spent at feeder measured in minutes and number of visits, and the number of meals can be calculated. Body weight was determined every 28 days and average daily gain (ADG), feed conversion ratio (FCR) and gain-to-feed (G-to-F) calculated. Time spent at the feeder, number of visits and meals are on a 24-hour cycle. A meal is defined as a distinct, separate eating period and visit not separated by intervals longer than seven minutes.

The steers were handled every 28 days between Aug. 26, 2013, and Feb. 5, 2014. For each working period, cattle were weighed and evaluated for temperament, and a blood sample was taken via jugular venipuncture. Temperament data were obtained using Farmtek Electronic Timers (Farmtek Inc; 1000 N. Hwy 78, Suite D, Wylie, Texas 75098) to capture the time to cover the distance between the head catch and the overhead door exiting the working facilities. This was converted to exit velocity (ft/s)

On Feb. 6, 2014, finished steers (n=113, mean BW = $1,337.5 \pm 96.56$ pounds) were transported approximately 330 miles to a processing plant. Carcass characteristics

were evaluated and collected at the processing plant. Carcass data collected include rib-eye area (REA); marbling; back fat (BF); yield grade (YG); kidney, pelvic, and heart fat (KPH); hot carcass weight (HCW); dressing percentage (DP); and liver abscess score (0-3; 0 = no abscesses; 3 = is more than five active small abscesses or more than one large active abscess).

The variables of interest assessed in this project were exit velocity (ft./s), ADG, DMI, time spent at feeder, number of visits, FCR, G-to-F, number of meals, HCW, YG, REA, marbling, BF and KPH. The correlation procedure of SAS (SAS Ins. Inc.,

Cary, N.C.) was used to evaluate the relationships between temperament, feeding behavior and performance. Significance was determined with a level of significance of $P \leq 0.05$.

Results and Discussion

Exit velocity was correlated (Table 1) negatively with HCW (-0.28; $P = 0.002$), marbling (-0.37; $P < 0.001$) and YG (-0.17; $P = 0.07$). Thus, steers that exited the chute at slower speed (considered to be calmer animals) would have better HCW and marbling, and tended to have better YG than steers that exited the chute at a greater rate of speed. Dry-matter intake was cor-

related positively with time spent at the feeder (0.21; $P = 0.02$), number of visits per day (0.26; $P = 0.005$) and ADG (0.59; $P < 0.001$), as well as with carcass traits of HCW (0.67; $P < 0.001$), YG (0.30; $P = 0.001$), marbling (0.24; $P = 0.01$) and BF (0.22; $P = 0.02$).

Time spent at the feeder was correlated positively with the number of meals (0.27; $P = 0.004$), ADG (0.24; $P = 0.01$) and HCW (0.21; $P = 0.02$). The number of visits per day had a positive correlation with FCR (0.24; $P = 0.01$) and a negative correlation with G-to-F (-0.25; $P = 0.008$). The number of meals per day had a negative correlation with marbling

Table 1. Correlations between exit velocity, carcass traits, feeding behaviors and growth performance.

	Exit Velocity	HCW	YG	REA	Marbling	Rib Fat	KPH	DMI	Bunk Time	Visits	Meals	ADG	FCR
HCW	-0.28 (0.002)												
YG	-0.17 (0.07)	0.33 (<0.001)											
REA	-0.01 (0.90)	0.39 (<0.001)	-0.54 (<0.001)										
Marbling	-0.37 (<0.001)	0.23 (0.01)	0.37 (<0.001)	-0.05 (0.60)									
Rib Fat	-0.10 (0.28)	0.29 (0.002)	0.81 (<0.001)	-0.09 (0.34)	0.36 (<0.001)								
KPH	0.03 (0.72)	-0.27 (0.005)	0.42 (<0.001)	-0.22 (0.02)	0.37 (<0.001)	0.54 (<0.001)							
DMI	-0.15 (0.12)	0.67 (<0.001)	0.31 (0.001)	0.16 (0.09)	0.24 (0.01)	0.22 (0.02)	-0.11 (0.25)						
Bunk Time	-0.15 (0.11)	0.21 (0.02)	0.15 (0.12)	0.03 (0.78)	0.005 (0.96)	0.13 (0.17)	-0.02 (0.83)	0.21 (0.02)					
Visits	0.06 (0.55)	-0.13 (0.15)	-0.21 (0.02)	0.10 (0.31)	-0.11 (0.24)	-0.13 (0.15)	-0.12 (0.20)	0.26 (0.005)	0.10 (0.31)				
Meals	0.05 (0.56)	-0.06 (0.52)	-0.15 (0.11)	0.11 (0.24)	-0.19 (0.05)	-0.07 (0.44)	-0.16 (0.10)	.14 (0.13)	0.27 (0.004)	0.67 (<0.001)			
ADG	-0.13 (0.17)	0.71 (<0.001)	0.32 (0.001)	0.17 (0.07)	0.05 (0.61)	0.22 (0.02)	-0.19 (0.05)	0.59 (<0.001)	0.25 (0.01)	-0.03 (0.77)	-0.02 (0.87)		
FCR	0.05 (0.57)	-0.32 (0.001)	-0.14 (0.15)	-0.08 (0.43)	0.13 (0.19)	-0.09 (0.34)	0.14 (0.15)	0.09 (0.33)	-0.10 (0.31)	0.24 (0.01)	0.13 (0.17)	-0.74 (<0.001)	
GF	-0.04 (0.65)	0.32 (0.001)	0.13 (0.17)	0.08 (0.40)	-0.14 (0.14)	0.08 (0.39)	-0.16 (0.10)	-0.10 (0.29)	0.11 (0.24)	-0.25 (0.01)	-0.13 (0.18)	0.74 (<0.001)	-0.99 (<0.001)

(-0.19; $P = 0.05$).

Temperament did not have any significant correlation with feeding behavior or growth performance. Average daily gain was correlated negatively with FCR (-0.74; $P < 0.001$) and correlated positively with G-to-F (0.74; $P < 0.001$). Average daily gain also was correlated positively with HCW (0.71; $P < 0.001$), YG (0.32; $P < 0.001$) and BF (0.22; $P = 0.02$), and correlated negatively with KPH (-0.19; $P = 0.05$).

The relationships among temperament, feeding behavior and growth performance had limited

significance. Performance on feed and temperament has been documented with much higher frequency than feeding behavior and temperament. Focusing on the initial adaptation period and the final months on the trial may show significance not seen across the entire study. Reviewing the complete data set could show further relationships among temperament, feeding behavior and carcass characteristics.

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