BEEF CATTLE RESEARCH UPDATE

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

August 2015

Influence of Feed Efficiency Ranking on Diet Digestibility and performance of Beef Steers

Iowa State University (ISU) and University of Missouri (MU) research determined the effects of growing phase diet, growing phase feed efficiency, and finishing phase diet on diet digestibility and finishing phase feed efficiency.[1] In this study, 373 steers (two trials) were at MU during a 70 day growing phase and shipped to ISU for finishing. At both locations, the steers were fed using a GrowSafe feeding system so that individual feed intake could be recorded. During the growing phase, steers were fed either whole shell corn or roughage-based diets. After this growing phase the 12 greatest and 12 least feed efficient steers from each trial and diet were selected for further evaluation (96 head total with average weight of 1074 lb) and shipped to ISU for finishing. At ISU, the steers were fed receiving diets similar to the growing phase diets for 14 days and then transitioned to corn or byproduct (distiller's grains with solubles) based diets.

These researchers reported that the steers classified as most efficient during the growing phase tended to exhibit greater growing phase diet dry matter (DM) digestibility than the least efficient steers (69.1% vs 65.5%; P = 0.13). However, growing phase feed efficiency classification had no effect on finishing phase diet digestibility. They also noted that diet DM digestibility was positively correlated between phases when grown and finished on similar diets (either corn based growing and finishing diets or roughage based growing diet and byproduct based finishing diets). The steers classified as most efficient during the growing phase still had greater finishing phase efficiency. However, there was a negative correlation for efficiency between phases for steers fed roughage-based growing diets and corn based finishing diets. These results suggest that cattle that excel (more efficient) on high fiber diets may have poorer performance on high grain (starch) diets illustrating that cattle should be tested for feed efficiency using diets similar to the production environment of interest.

Effects of Backgrounding Rate of Gain on Carcass Characteristics

South Dakota State University research evaluated the effect of rate of gain during a feedlot backgrounding phase on hot carcass weight (HCW) and marbling in steers harvested at a common fatness.[2] In this study, steers were randomly allotted to 1 of 3 backgrounding growth rates of 1) 3.0 lb/day for 63 days, 2) 2.5 lb/day for 79 days, and 3) 2.0 lb/day for 93 days from 697 to 878 lb body weight. All steer were fed a basal corn silage diet with steers on treatment 2 and 3 being limit fed to achieve the targeted rates of gain. At the end of backgrounding, the steers were switched to a common finishing diet and harvested, as a treatment, at a common back fat thickness (0.55 inches). The effects of treatment on performance and carcass characteristics are shown in Table. 1. The total days required to reach a common fat thickness were 187, 201, and 212 days, respectively for backgrounding rates of gain of 3.0, 2.5, and 2.0 lb/day. During the finishing phase of the experiment, average daily gain (ADG) linearly increased and dry matter intake (DMI), and Gain to Feed ratio quadratically increased as backgrounding rate of gain decreased. HCW linearly increased and marbling score quadratically increased as backgrounding rate of gain decreased. It was reported that other carcass characteristics were similar (P > 0.05) among treatments. These researchers concluded that the linear response in HCW and quadratic response of marbling suggest that for a given frame size of a calf, there is an ideal backgrounding rate to optimize carcass quality and value. An excessive backgrounding rate of gain caused the accumulation of total body fatness to exceed marbling deposition resulting in "steers finishing prematurely with no advantage in marbling". In contrast, if the backgrounding rate of gain was too low, marbling was lower, even though steers were fed to a common fat end point at a heavier body weight.

Table 1. Effect of backgrounding rate of gain on performance and carcass characteristics.

	Backgrounding ADG (#days)			
Item	3.00 (63)	2.50 (79)	2.00 (93)	P-value
Backgrounding Phase				
Cold stress corrected ADG, lb	3.04	2.54	2.21	< 0.001
G:F	0.153	0.138	0.135	< 0.001
Finishing Phase				
Total Days on Feed	187	201	212	
ADG, lb	3.59	3.90	4.10	< 0.05, Linear
DMI, lb	22.62	23.13	24.48	< 0.05, Quadratic
G:F	0.159	0.169	0.167	< 0.001, Quadratic
Carcass Characteristics				
HCW, lb	822	849	858	< 0.05, Linear
Marbling	Sm70	Sm85	Sm54	< 0.05, Quadratic

Adapted from Taylor et al., 2015.

[1] Russell, J. R., N. O. Minton, W. J. Sexten, M. S. Kerley, and S. L. Hansen. 2015. Influence of feed efficiency ranking on diet digestibility and performance of beef steers. In: Plains Nutrition Council Spring Conference, San Antonio, TX. p. 125-126 (Abstr.).

[2] Taylor, A. R., R. H. Pritchard, and K. W. Bruns. 2015. Effects of backgrounding rate of gain on carcass characteristics. J. Anim. Sci. 93 (Suppl. 2): 90-91 (Abstr.).