Effects of Bedding during the Summer and Protein Level on Angus Steer Performance and Carcass Traits

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A summer finishing project was conducted with 139 head of fall born and yearling steers consigned by five Angus producers from North Dakota under a new producer consignment project identified as the North Dakota Angus University. The project was featured on the North Dakota Angus Association tour on September 17, 2012, and on other tours at the Center. This report covers the feedlot performance for the first 112 days of the study until yearling steers were marketed and includes the carcass data for the 68 head of yearlings. A complete report on the greenhouse gas emissions, manure volume and nutrient content and the performance and carcass data of the fall calves will be published in the future.

The objectives of the study were to evaluate the effects of normal (~12%) versus high (~17%) protein diets on steer performance and carcass traits and to evaluate the effects of bedding with corn stover during the summer to mitigate heat stress, sequester nutrients in the manure and reduce greenhouse gas emissions.

The study (2x2 factorial design) was conducted in 16 pens at the Carrington Research Extension Center with four pens per treatment. The high protein diet included a higher percentage of distillers grain (Table 1). Corn stover was used for bedding in eight pens and added approximately bi-weekly.

Table 1. Finishing rations for North Dakota Angus University steers.

	Control	High Protein
	Percent, DM basis	
Corn, dry rolled	64.98	44.44
Mod dist grain	15.97	36.79
Corn silage	7.93	7.97
Straw	9.37	9.02
Suppl, Ion, min, Vit	1.84	1.79
Nutrients		
Dry Matter	69.74	62.26
NEg	62.99	63.40
Crude Protein	12.01	16.41
Calcium, %	0.21	0.23
Phosphorous, %	0.31	0.33
Potassium, %	0.58	0.65

Steers were delivered in May of 2012, fed a common diet, blocked by weight and assigned to treatments and pens on June 14. Cattle were fed totally-mixed rations to appetite once daily in fenceline bunks with continuous access to automatic water fountains. Steers were weighed every 28 days and feed intake, gain, and efficiency reported by weigh period. Yearling steers (n = 68) were shipped to Tyson Fresh Meats, Dakota City, NE, on October 2, when it was determined that 80 percent or more would grade USDA Choice or better. Carcass data was collected by a trained grader, summarized and reported to the owners for each individual animal. The data were analyzed using SAS mixed procedures.

The steers gained very well throughout the study. No effect of protein content was apparent as feed intake (P = 0.99) gain (P = 0.98) and feed efficiency (P = 0.99) were similar for all treatment groups (Table 2). Similarly, bedding had minimal effect on feed intake (P = 0.77), gain (P = 0.15), and feed efficiency (P = 0.75). Carcass traits were similar for all treatments (P > 0.15) with no effect of diet or bedding (Table 3).

Table 2. Summer performance of steers fed two protein levels with and without bedding.

						P Value		
	Control	High Protein	Bedding	No Bedding	St Err	Diet	Bed	D x B
No. Head	34	35	35	34				
Initial Wt, lb	854	863	858	858	20.09	0.75	0.99	0.75
Final Wt, lb (day 112)	1356	1365	1351	1370	21.12	0.75	0.53	0.79
Avg Daily Gain, lb	4.61	4.61	4.53	4.7	0.08	0.98	0.15	0.51
DMI, lb/hd/d	27.34	27.32	27.12	27.55	0.99	0.99	0.77	0.78
Feed Eff, DM/gain	5.95	5.96	6.02	5.89	0.28	0.99	0.75	0.99

Table 3. Carcass traits of yearling steers fed two protein levels with and without bedding.

						P Value		
	Control	High Protein	Bedding	No Bedding	St Err	Diet	Bed	D x B
Shrunk wt., lb	1415	1416	1404	1426	17.00	0.96	0.37	0.81
Hot carcass wt., lb	895	903	891	907	12.06	0.63	0.35	0.78
Dressing percent	63.24	63.79	63.45	63.59	0.29	0.18	0.73	0.93
Marbling score	557	516	547	525	20.03	0.15	0.43	0.58
Fat thickness, in	0.68	0.71	0.69	0.70	0.03	0.45	0.89	0.35
Rib eye area, sq in.	13.98	14.05	13.89	14.13	0.21	0.82	0.44	0.76
Kidney, pelvic heart fat, %	2.41	2.46	2.41	2.46	0.05	0.47	0.42	0.59
Yield Grade	3.60	3.70	3.64	3.66	0.12	0.56	0.94	0.48

Temperature of the bedded surface vs. black dirt in the feeding pens was recorded in the morning, noon, and early evening with cooler temperatures of 2, 6, and 9 degrees reported for bedding during June and July.

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