

EFFECTS OF BEDDING ON FEEDLOT PERFORMANCE, CARCASS QUALITY, AND NET RETURN OF STEERS FED DURING THE WINTER IN NORTH DAKOTA

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Introduction

Many North Dakota farmer-feeders bed their calves with straw and spread the manure pack back on cropland as part of their fertility program. Bedding can make animals more comfortable, improve performance, and increase net return, as well as improve the carbon –nitrogen ratio in manure to facilitate effective composting and greater nitrogen retention.

Procedures

Steer calves born and raised at the Carrington Research Extension Center were allotted to three bedding treatments in late fall of 2001 (n=53) and 2002 (n=54) after weaning and preconditioning. The bedding treatments were no bedding, modest bedding, and generous bedding. Steers were fed the same finishing diet (84% concentrate corn-based diet) to appetite. All calves were weighed every 28 days to compare performance during segments of the winter and spring. Steer calves were fed to finish weight with carcass data collected at slaughter. Economics were calculated based on feed intake, gain, feed efficiency, carcass value, and bedding costs.

Modest bedding was a minimalist approach to keeping some bedding under the calves during inclement winter weather and generous bedding was essentially double the amount provided in the modest bedding treatment. Straw was added approximately weekly.

During the trial, calves were observed to have variable amounts of tag or manure attached to their hide associated with bedding treatment. A five point scoring system was developed to quantify the amount of tag on the hide and all steers were scored prior to going to market. The scoring system was 1=no tag, clean hide, 2=small lumps attached to the hide in limited areas of the legs and underbelly, 3=small and large lumps attached to the hide covering larger areas of the legs, side and underbelly, 4=small and large lumps of manure attached to the hide in even larger areas along the hind quarter, stomach, and front shoulder, and 5=lumps of manure attached to the hide continuously on the underbelly and side of the animal from brisket to rear quarter.

Results

Feedlot performance

Dry matter intake (Table 1) was not affected by bedding treatment ($P<0.05$). Non-bedded steers fluctuated more in feed intake but differences balanced out over weigh periods and multiple years (replicates) of the study. Gains responded significantly ($P<0.05$) in two of the four month-long weigh periods and overall. Generously bedded steers gained 3.53 lbs. per day, modestly bedded steers gained 3.69, and steers without bedding gained 2.83. Gain per lb. of feed improved significantly ($P=0.06$) in one period and tended to improve overall for bedded steers ($P=0.09$).

Animal Tag

The least amount of tag was attached to the generously-bedded animals (1.58 tag score), more tag on the modestly bedded animals (2.64 tag score), and much more (3.75 tag score) associated with no bedding. The excessive tag on the non-bedded calves added to their discomfort by reducing any protection dry hair on a clean hide provides. Calves in this group were observed to be stiff and slow to get up. Individual steer weights used for calculating average daily gains included manure tags attached to the hide which may have inflated gains slightly.

Carcass Quality

Most carcass quality traits (Table 2) were also positively affected by bedding ($P<.05$). Final weight was greater for both bedded treatments at 1182 and 1172 lbs. versus 1121 for steers with no bedding. Carcass weight and dressing percent improved with bedding, again affected by the weight of manure tag on the non-bedded calves. Marbling scores, the indicator for carcass quality grade, improved with bedding as did the percent of carcasses grading choice. Twenty three percent of carcasses from steers without bedding graded choice, versus 45% and 63% for bedded steers. Rib eye area tended to increase ($P=0.06$) with bedding from 11.47 square inches to 12.09, and 11.99 for normal and extra bedding, respectively. Yield grade, fat thickness over the 12th rib, and internal fat (kidney, pelvic, heart fat (KPH)) were not affected by bedding. Steers with no bedding may have improved in carcass quality with another 50 pounds of gain which would have taken several more days on feed.

Economics of Bedding

Cost for bedding was \$5.77 per head for modestly bedded steers and \$10.15 for generously bedded steers. If steers are sold on a realtime grid using \$1.20/cwt for carcass weight for choice cattle and \$1.10 for select cattle, the advantage for bedding is \$61.76 for modest bedding and \$81.61 for generous bedding (Table 3).

Table 1. Effect of bedding on feed intake, gain, and feed efficiency for steers finished in North Dakota during the winter

Item	Treatment			Std Error	P value
	No bedding	Modest bedding	Generous bedding		
Number of head	34	35	35		
Initial wt, lb	725	726	727	12.2	0.85
Dry matter intake, lb/hd/d	21.99	21.96	22.16	1.56	0.99
Avg daily gain lb**	2.83	3.69	3.53	0.06	0.01
Gain/feed	0.131	0.172	0.161	0.01	0.09

**Actual weight gains may be lower than reported due to higher levels of manure tags on the steers in the no bedding treatment.

Table 2. Effect of bedding on carcass quality for steers finished in North Dakota during the winter

Item	Treatment			Std Error	P value
	No bedding	Modest bedding	Generous bedding		
Final weight, lb	1121	1182	1172	18.41	0.02
Carcass wt, lb	674	715	721	12.86	0.02
Dressing percent	61.95	62.33	63.43	0.38	0.02
Marbling score*	361	392	415	10.89	0.01
Percent Choice	23	45	63	-	-
Yield grade**	2.98	3.03	3.09	0.07	0.30
Fat thickness, in.	0.39	0.43	0.46	0.03	0.13
Rib eye area, square in.	11.47	12.09	11.99	0.25	0.06
KPH, %	2.43	2.51	2.43	0.05	0.14

* Marbling score is numeric value based on dispersion of fat inside ribeye muscle, 300-399 = select, 400-499=low choice. Higher scores = more marbling and higher carcass value

** Yield grade is a measure of fat to lean ratio, 1=lean, 5=fat.

Table 3. Economic returns for bedding for finishing steers in North Dakota during the winter

	Treatment		
Item	No bedding	Modest bedding	Generous bedding
Avg carcass value for grid prices @ \$1.20 for Choice or better and \$1.10 for Select, \$	756.92	818.68	838.53
Advantage for bedding, \$/hd	-	61.76	81.61