Effects of Bedding During the Winter on Performance of Growing Heifers and Finishing Steers and Impact of Straw on Nutrients in Manure

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Introduction

Livestock perform better when not subjected to environmental stress. Feeding cattle in the winter, with snow, cold winds, and subsequent spring mud creates a challenge for feedlot managers. Many North Dakota farmer-feeders use straw liberally for their calves and haul the raw manure back to cropland as part of their fertility program. Composting manure will stabilize nutrient release for crops and decrease the volume of product to haul. Nitrogen volatilization from manure is considered to be a major environmental problem.

Procedures

Calves born and raised at the Carrington Research Extension Center were allotted to three bedding treatments after weaning and preconditioning in November of 2001. The bedding treatments were no bedding, modest bedding, and generous bedding. Three pens of steers (n=55) and three pens of heifers (n=53) were used in the study. Steers were fed the same finishing diet (84% concentrate) to appetite with a growing diet (50% concentrate) offered to all heifers. Carcass data were collected and economic returns calculated based on feed intake, gain, feed efficiency, and carcass value. The modest bedding treatment provided approximately 200 pounds of straw per head for the winter with over 400 pounds used for the generous bedding treatment.

Results

Feed intake was similar between treatments for finishing steers. Daily gains appear to highly favor bedding for finishing steers, without regard for amount of bedding. Steers with no bedding gained 3.16 lbs./day vs. 3.63 and 3.60 for normal and extra bedding, respectively. Gains during the spring were dramatically lower for non-bedded steers at 1.50 lbs./day. Heifers showed much less gain response due to bedding. No bedding resulted in 1.94 lbs./day vs. 2.02 and 2.04 for normal and extra bedding, respectively, with some monthly variation observed. Feed efficiency (pounds of gain per pound of feed) for steers was .179 for no bedding, .184 for normal bedding, and .161 for extra bedding. Feed efficiency for heifers appears to improve with increasing bedding, however.

Minimal manure tag was attached to the animals with extra bedding, with more tag on the normally bedded animals, and much more associated with no bedding for both steers and heifers (Table 1). Carcass traits appear to be significantly improved with bedding (Table 2) starting with increased hot carcass weight which is a reflection of improved gains in the bedded treatments. Dressing percent also appears to improve with bedding partially due to amount of manure tag on the non-bedded cattle. Quality grade evidence by marbling scores and percent of carcasses grading choice or better shows increases with bedding. Yield grade, fat thickness and rib eye area are all variables affected by level of condition. Steers with no bedding may have improved in carcass quality with another 70 pounds of gain which would have taken another 20 days on feed.

The cost of bedding amounted to an average of $3.11 per head for normal bedding and $6.22 for extra bedding. Cost per pound of gain is calculated at $.284 for no bedding, $.255 for normal bedding, and $.268 for extra bedding. Returns above feed and bedding costs when cattle are sold on a flat bid of $1.12/lb. carcass produced a return of $48.15 for no bedding, $91.05 for normal bedding, and $84.79 for extra bedding. If carcasses were sold on a grade and yield basis at $1.15 for Choice or better and $1.10 for Select, returns are calculated at $43.42 for no bedding, $92.97 for normal bedding and $95.69 for extra bedding.

Clean steers in bedded pens gained faster.

Nutrients in Manure

Dry matter decreased with increasing straw suggesting more retention of moisture with straw. Organic matter increased with addition of generous bedding by approximately two times over no bedding and a substantial increase over normal bedding. Nitrogen content appeared to change little from the no bedding to the normal bedding treatments but increased noticeably for generous bedding, probably due at least partially from retention of nitrogen in urine and feces.

Discussion

Bedding appears to improve finishing steer performance, carcass quality and returns according to this study. While bedding is important for the comfort of the animals, it may be more important as an added carbon source and effectively limiting ammonia release from manure. Data from this trial will continue to be collected and reported.

Table 1. Effect of bedding on performance of steers and heifers.

	Treatment		
Steers	No Bedding	Normal Bedding	Extra Bedding
Number of head	18	18	18
Initial wt, lb	681.8	688.4	688.0
Dry matter intake, lb/hd/d	19.66	19.69	20.10
Avg daily gain lb*	3.16	3.63	3.60
Gain/feed	.179	.184	.161
Heifers			
Number of head	18	17	18
Initial wt, lb	627.5	633.3	628.4
Dry matter intake, lb/hd/d	18.12	17.56	16.93
Avg daily gain, lb*	1.94	2.02	2.04
Gain/feed	.107	.115	.120
Tag** score on steers	3.75	2.64	1.58
Tag** score on heifers	2.94	1.24	1.11

*Actual weight gains may be lower than reported for no bedding treatment as animal weights included manure tag.

* *Scored on a 1-5 scale; 1=clean hides, 5= tag covering all of lower animals hide

Table 2. Effect of bedding on carcass quality.

	Treatment		
Item	No bedding	Normal bedding	Extra bedding
Final weight, lb	1116.8	1186.8	1182.0
Carcass wt, lb	678.1	727.4	726.8
Dressing percent	60.72	61.29	61.49
Marbling score	378	415	436
Percent choice	28	50	72
Yield grade*	2.59	2.72	2.80
Fat thickness	.37	.42	.43
Rib eye area, sq in.	12.04	12.66	12.48

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