

## Beef Cattle Feeding in a Deep-Bedded Hoop Barn: Year One

### A.S. Leaflet R2189

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### Summary and Implications

A three-year study evaluating the performance of yearling steers in a deep-bedded hoop barn has completed the first year. A 50 × 120 foot hoop barn was constructed at the ISU Armstrong Research Farm in the late fall of 2004. The comparison feedlot is an outside lot with shelter that includes a drive-through feed alley. For the first year of the three-year study, two groups of yearling steers were fed. The first group (Group 1) was put on test August 5, 2005 and marketed on November 15, 2005 for a summer/fall feeding period. The second group (Group 2) was put on test December 21, 2005 and marketed in two drafts on April 4, 2006 and May 10, 2006 for a winter/spring feeding period. Overall the cattle performed similarly with similar carcass data for both housing systems. The information presented is the first year of a three-year study. The cattle had a lower mud score in the hoop barn, particularly for the winter/spring feeding period. As expected the deep-bedded hoop system used more bedding than the semi-confinement lots. The bedded hoop barn required about 5 to 6 lb of cornstalk bedding per head per day that the steers were on feed.

### Introduction

Iowa's beef cattle feeding industry is systematically evaluating its environmental management. As the Iowa cattle feeding industry focuses on environmental management, there has been increasing interest in systems where runoff is minimized. One example of such a facility is the deep-bedded confinement building. These buildings typically are solid-floor confinement buildings that are totally enclosed. The most common building types are steel monoslope or post-frame construction. A hoop barn with a partial concrete floor is another alternative with lower construction costs. A three-year study evaluating the performance of yearling steers in a deep-bedded hoop barn has completed the first year.

### Materials and Methods

A 50 × 120 foot hoop barn was constructed at the ISU Armstrong Research Farm in the late fall of 2004. The

building houses 120 head in three pens. A description of the building is reported in Animal Industry Report (ASL-2000) and Hoop Barns for Beef Cattle (MidWest Plan Service AED-50). A feed bunk is along the east side of the hoop barn. Both ends of the hoop barn are open. During the winter, large round bales are stacked three high across the north and south end of the hoop barn for a partial windbreak. Slightly more than half of each end at ground level is blocked. The comparison feedlot is an outside lot with shelter that includes a drive-through feed alley. This facility includes three pens, each with a capacity of approximately 40 head per pen. In summer 2005, a 3-year experiment began comparing the two facilities with two groups of yearling steers each year.

For the first year of the three-year study, two groups of yearling steers were fed. The first group (Group 1) was put on test August 5, 2005 and marketed on November 15, 2005 for a summer/fall feeding period. The second group (Group 2) was put on test December 21, 2005 and marketed in two drafts on April 4, 2006 and May 10, 2006 for a winter/spring feeding period. The steers were randomly allotted to pens within each housing treatments. There were approximately 40 head of steers per pen.

The first group of steers was extremely nervous and difficult to sort. Some of the cattle were not able to be fed on the trial, resulting in fewer than 40 head per pen. The numbers of steers in the hoop were 38, 36, and 37 steers per pen and in the feedlot 38, 37, and 40 head per pen. The diet fed was 78% dry corn, 17% ground hay, and 1% supplement on a dry matter basis. Water was added to the diet to improve mixing. Performance, carcass, labor, and bedding use data were collected. Means by season and housing type are presented.

### Results and Discussion

Results of cattle performance by housing type and season are shown in Table 1. No statistical analysis was conducted because there are partial results of a 3-year trial. Average daily gain may be slightly less in the bedded hoop barn than the semi-confinement lots. Average daily feed intake was similar for the two housing systems. Feed efficiency was similar in the summer and may be slightly poorer for the hoop-fed cattle in the winter. The cattle had a lower mud score in the hoop barn, particularly for the winter/spring feeding period. Table 2 presents the carcass data by season and housing type. Yield, fat thickness, KPH fat, ribeye area, and marbling score did not differ between the housing systems. The percentage of cattle that graded Choice or better and had a yield grade of 1 or 2 was slightly less in a hoop barn. Table 3 is a summary of labor and bedding use by system and season. As expected the deep-

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bedded hoop system used more bedding than the semi-confinement lots. The bedded hoop barn required about 5 to 6 lb of cornstalk bedding per day that the steers were on feed. The winter/spring feeding group used the amount of bedding at the higher end of this range. Labor for cleaning and bedding totaled 40.3 hours for the two groups in the hoop barn and 29.8 hours in the semi-confinement lots, although the hoop barn was cleaned after each group and the semi-confinement was cleaned only after the second group because of weather conditions.

Overall the cattle performed similarly with similar carcass data for both housing systems. The information

presented is the first year of a three-year study. The trend of slightly slower gains particularly in winter will be closely monitored. Perhaps the hoop barn cattle, although under a roof at all times, would benefit from more of a windbreak during winter.

### Acknowledgements

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**Table 1. Performance of yearling steers in a hoop confinement barn and semi-confinement lots in summer and winter.**

Item	Unit	Summer/fall <sup>1</sup>		Winter/spring <sup>2</sup>	
		Hoop	Feedlot	Hoop	Feedlot
Head (start)	hd	111	115	120	120
Head (end)	hd	110	115	120	120
Death loss	%	0.90	0	0	0
Days on feed	d	103	103	111	115
Initial weight	lb	921.0	924.5	943.1	943.8
Final weight	lb	1,378.3	1,388.3	1,346.6	1,372.4
Gain	lb	457.3	463.8	403.5	428.5
Avg. daily gain	lb/d	4.44	4.51	3.66	3.79
Avg. daily feed intake (100% dm)	lb/d	28.0	28.4	26.4	26.6
Feed/gain (100% dm)	lb/lb	6.31	6.31	7.21	7.02
Final mud score (1=clean, 5=dirty)	1-5	1.0	1.1	2.0	2.3

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**Table 2. Carcass characteristics of yearling steers in a hoop confinement barn and semi-confinement lots in summer and winter.**

Item	Unit	Summer/fall <sup>1</sup>		Winter/spring <sup>2</sup>	
		Hoop	Feedlot	Hoop	Feedlot
Hot carcass weight	lb	830.9	837.2	826.1	844.8
Yield	%	60.3	60.3	61.4	61.6
Fat cover	in.	0.41	0.42	0.47	0.47
Kidney/pelvic/heart fat	%	2.8	2.9	2.1	2.2
Ribeye area	in. <sup>2</sup>	13.3	13.2	13.0	13.2
Marbling score		1027	1022	1065	1065
Choice or better	%	75.5	72.2	87.5	93.3
Yield grade 1 and 2	%	60.9	63.2	55.8	57.5

**Table 3. Labor and bedding use in a hoop confinement barn and semi-confinement lots in summer and winter.**

Item	Unit	Summer/fall <sup>1</sup>		Winter/spring <sup>2</sup>	
		Hoop	Feedlot	Hoop	Feedlot
Bedding	lb/hd/d	5.1	0	5.9	1.2
Bedding	lb/lb gain	1.1	0	1.6	0.3
Labor (cleaning/bedding)	hr/group	20.5	2.0 <sup>3</sup>	19.8	27.8 <sup>3</sup>

<sup>1</sup>Summer/fall group started on test August 5, 2006 and was marketed on November 15, 2005.

<sup>2</sup>Winter/spring group started on test December 21, 2005 in two groups. The second group was marketed on May 10, 2006.

<sup>3</sup>Due to sudden cold weather, the feedlot was not cleaned after the summer/fall group.

The manure for the summer/fall group was removed after the winter/spring group, thus the winter/spring labor is the labor to remove the manure for two groups.