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

### A.S. Leaflet R2281

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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 second 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. Two groups of yearling steers were fed each year. The summer/fall groups were put on test in August and marketed in November. The winter/spring groups were put on test in December and marketed in two drafts in April/May. Overall the cattle performed similarly with similar carcass data for both housing systems. The information presented is for two years of a three-year study. The cattle had a lower mud score in the hoop barn, particularly for the winter/spring feeding periods. 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 industry is comprehensively evaluating the environmental management of feedlots. 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 hoop barn with a partial concrete floor. A three-year study evaluating the performance of yearling steers in a deep-bedded hoop barn has completed two years.

#### 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.

Each year of the three-year study, two groups of yearling steers were fed. The summer/fall groups were put on test in August and marketed in November. The winter/spring groups were put on test in December and marketed in April/May. The steers were randomly allotted to pens within each housing treatments. There were approximately 40 head of steers 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 these 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 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 was slightly less in a hoop barn for the winter/spring groups. Table 3 is a summary of labor and bedding use by system and season. 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 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 averaged about 40 hours per group regardless of housing system.

Overall the cattle performed similarly with similar carcass data for both housing systems. The information presented represents two years of a three-year study. The trend of slightly slower gains and poorer feed/gain 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.

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Leopold Center for Sustainable Agriculture, the Wallace Foundation for Rural Research and Development, and personal donations of many western Iowa cattle feeders.

**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
Pens		6	6	6	6
Head (start)	hd	232	236	240	240
Head (end)	hd	229	235	240	240
Days on test	d	93	93	108	110
Initial weight	lb	947	950	912	913
Final weight	lb	1,361	1,380	1,302	1,321
Gain	lb	414	430	408	408
Avg. daily gain	lb/d	4.5	4.6	3.6	3.8
Avg. daily feed intake (100% dm)	lb/d	28.5	28.5	27.3	27.0
Feed/gain (100% dm)	lb/lb	6.4	6.2	7.5	7.2
Final mud score (1=clean, 5=dirty)	1-5	1.7	1.7	2.1	2.7

**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	839	846	810	818
Yield	%	61.4	61.0	61.9	61.6
Fat cover	in.	.42	.43	.44	.44
Kidney/pelvic/heart fat	%	2.9	3.0	2.2	2.2
Ribeye area	in. <sup>2</sup>	13.4	13.3	13.0	13.0
Marbling score		1,032	1,025	1,036	1,040
Choice or better	%	79.4	77.8	73.3	80.0
Yield grade 1 and 2	%	58.0	59.1	64.6	61.7

**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	4.6	0.0	5.8	2.0
Bedding	lb/lb gain	1.1	0.0	1.6	0.6
Labor <sup>3</sup> (cleaning/bedding)	hr/group	19.5	8.7	20.8	31.8

<sup>1</sup>Summer/fall groups started on test in August and were marketed in November.

<sup>2</sup>Winter/spring groups started on test in December were marketed in April/May.

<sup>3</sup>In 2005, 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 feedlot labor is the labor to remove the manure for three groups.