

Beef Cattle Feeding in a Deep Bedded Hoop Barn: A Preliminary Study

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Darrell Busby, beef extension field specialist; Shawn Shouse, extension field engineer; Mark Honeyman, professor of animal science; Dan Loy, professor of animal science; Jay Harmon, professor of ag and biosystems engineering; Dallas Maxwell, ag specialist, Armstrong Research Farm

Summary and Implications

A deep bedded hoop confinement building was constructed at the ISU Armstrong Research Farm in Southwest Iowa in 2004. The building consists of three pens. Shortly after the completion of construction a preliminary study was initiated to compare performance, carcass characteristics, and bedding and labor use to that of a conventional semi-confinement system. The cattle used in this study were steer and heifer calves from the ISU McNay Research Farm. Performance and carcass measurements appeared similar comparing the two systems. However, the hoop building cattle used more bedding and appeared to have lower mud scores. Labor use may have favored the hoop building compared to the conventional system. In 2005, a three year study was initiated to compare the systems with yearling steers. Two turns of yearling cattle will be fed each year, one in summer and one in winter.

Introduction

The Iowa cattle feeding industry is currently in the process of systematically evaluating its environmental management. Since 2001, 1800 Iowa feedlots have registered for environmental evaluation of compliance with



the Iowa DNR. Less than 10% of these are in need of an operating permit. As the Iowa beef industry invests in environmental management, there has been increasing interest in systems where runoff control facilities are 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 construction building, with a partial concrete floor could reduce construction costs. There is, however, no research comparing deep bedded hoop barns to other types of systems for beef cattle.

Materials and Methods

A 50 x 120 foot hoop barn was constructed at the Armstrong Research Farm in the late fall of 2004. The building houses 120 head in three pens. A description of the building and preliminary plans are reported in last year's Animal Industry Report (ASL R-2000) and Hoop Barns for Beef Cattle (MidWest Plan Service AED-50). The control facility is an outside lot with shelter that includes a drive through feed alley. This facility includes 3 pens, each with a capacity of approximately 40 head per pen. Beginning in summer, 2005, a 3-year experiment is planned comparing the two facilities with two turns of yearling cattle per year. Data will be collected on performance, cost, bedding use, labor and manure output. In the fall of 2004 a feasibility trial was conducted with steer and heifer calves from the McNay Research Farm. Two pens of steers were allotted to each system. One heifer pen was allotted to the hoop building and two heifer pens were allotted to the partial confinement. Within sex the cattle were stratified by weight and sire groups to housing system. Cattle were marketed in two groups, approximately five weeks apart based on a visual assessment of market readiness. 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. Without complete replication, no statistical analysis was conducted. Means by sex and housing type are presented.

Results and Discussion

Results of cattle performance by housing type and sex are shown in Table 1. Average daily gain, feed to gain and dry matter intake were not different between the systems, and within sex.

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Table 1. Performance by Housing Type and Sex of Cattle

Item	Semi-Confinement		Hoop Confinement	
	Steers	Heifers	Steers	Heifers
Initial Head	74	69	72	34
Head Marketed	72	69	70	34
Initial Weight, lb	651	611	652	611
Initial Body Condition Score	4.85	4.98	4.88	5.00
Days on Feed	141	137	138	133
Final Weight, lb	1174	1062	1166	1064
Average Daily Gain	3.73	3.30	3.74	3.43
Feed to Gain	5.71	6.05	5.78	5.9
Dry Matter Intake	21.3	20.00	21.6	20.2
Age at marketing (days)	386	383	381	381
Weight per Day of Age	3.05	2.78	3.08	2.79

Table 2 presents the carcass characterized by sex and housing type. Quality and yield grade data did not differ among the systems. There may have been lower mud scores in the hoop vs. the partial confinement. This will be a measurement to watch in future comparisons.

Table 2. Carcass Characteristics by Housing Type and Sex of Cattle

	Semi-Confinement		Hoop Confinement	
	Steers	Heifers	Steers	Heifers
Hot Carcass Weight, lb	720	659	716	656
Fat Cover, inches	0.40	0.44	0.38	0.42
Ribeye Area, sq. in.	12.5	12.5	12.7	12.6
Calculated Yield Grade	2.79	2.66	2.65	2.58
% YG 1 & 2	65%	67%	87%	74%
Marbling Score	SM 43	SM 60	SM 55	SM 81
% low Choice or better	79%	87%	89%	100%
% Premium Choice or better	19%	25%	26%	32%
Final Mud Score	1.92	1.90	1.70	1.53
Dressing Percent	61.2%	62.0%	61.2%	61.7%

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Table 3 is a summary of labor and bedding use by system. As expected the deep bedded hoop system used more bedding than the partial confinement. However, labor hours were similar, or perhaps slightly less than the partial confinement.

Table 3. Labor and Bedding Use by Housing Type

	Semi-Confinement	Hoop Confinement
Bales /150 Days/100 Hd	15	47
Hrs/150 Days/100 Hd	16.16	14.93

In this preliminary study animal performance and carcass characteristics of steer and heifer calves fed in a deep bedded hoop barn compared favorably to the partial confinement. The partial confinement system has been popular historically in Iowa because experience and research with similar partial confinement and open lot with shelter systems has been quite positive. Further study will investigate the seasonal performance of yearling steers in the two systems over a 3 year period. Two groups of yearling steers will be fed in each system, one fed in the summer and one in the winter. At the completion of the study a complete economic analysis will be conducted evaluating not only animal performance but also operational costs.

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