Observations of Cattle Hoof Health and Performance Over Time in Deep Bedded Monoslope Buildings

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Summary and Implications

The use of deep bedded, monoslope, cattle barns without complete manure removal can have negative implications regarding foot health and subsequent performance of feedlot cattle over time. More frequent manure removal may be part of the solution.

Introduction

Management of manure runoff from feed lots spawned a number of innovations one of these being the use of deep bedded, monoslope buildings. These buildings did accomplish the task of reducing runoff by redirecting rainfall, containing manure and providing a place to store manure. The monoslope also has merit in tempering the environment cattle are maintained in and positively influence cattle performance in some cases. However, over the past 20 years, the incidence of hoof troubles has increased substantially with hairy heel wart becoming a significant issue as well as foot rot also still being present. The impact of these hoof ailments has been significant in reducing the performance of cattle housed in these buildings to levels seen in open yards based on ISU Feedlot Monitor Closeouts/Benchmark reports.

These hoof issues are by no means only a deep bedded monoslope barn problem, but this paper will focus on the described monoslope since the data set pertains to this type of building. A number of management challenges exist and may contribute to this issue, such as manure removal, repayment of the building's bank note, ration formulation with excesses of sulfur and nitrogen, cattle sourcing, softened hooves, manure scalded skin around the hoof and bunk space restrictions are a few examples. In this write up the issue of manure removal is the focus.

Materials and Methods

A commercial feedyard that had been having significant hoof health issues in their deep bedded monoslope buildings was prevented from restocking the buildings immediately due to market conditions. This provided an opportunity to thoroughly clean out the buildings and allow them to sit empty for over six months before restocking. At restocking, the initial draft of cattle were yearling heifers. These heifers did exceptionally well when their closeouts were compared to previous groups. After these heifers completed the first turn, yearling steers were placed. Feed out data was collected on these placements over the next three years on the steer pens that were fed in these buildings. The buildings consisted of thirteen pens each being approximately 60 feet wide by 100 feet long. There was one bunk line per pen stretching the length of the pen. Pen manure packs were bedded as needed with the area in front of the bunk being scrapped free of manure also as needed while the rest of the manure pack being left intact between groups. Cattle, all of traditional beef breeding, entered the pens in one or two drafts weighing 750 to 890 pounds and remained in these pens until they were marketed which, on average, about 200 days later. These cattle were sourced from two order buyers. One in Missouri and one in Oklahoma. All cattle were given a copper sulfate foot bath at initial processing and then at re-implant time. Ration composition was similar during this time. There were no personnel changes with the consulting nutritionist and herdsman. Table 1 provides data regarding performance, finished weights and health treatments. In all, three to five turns of cattle were fed in these pens resulting in 50 closeouts that were collected over the observation period. Performance was plotted over time. The Mann-Kendall time analysis statistic was used to determine if the illustrated trend in the plots was significant.

Results and Discussion

The facilities had a history of hairy heel warts being present in the cattle that were fed, but after clean out and allowing them to sit empty the problem seemed to have gone away. As mentioned earlier, the steers were the second set of cattle to move through the facilities after the clean out and rest period. However, as time progressed and as subsequent drafts of new cattle were fed, the issue began to return along with other foot issues. Many of these foot issues were subclinical and were not treated except for the foot bath. Since management remained relatively consistent the manure base seems to have contributed to the issue. It is plausible that this manure pack creates a conducive environment for these organisms to re-establish and infect the foot tissue. Figures 1 and 2 display the change in daily weight gain and feed to gain conversion over time. Note the trend in reduced ADG ($R^2 = 0.59$) and increased feed dry matter per pound of live weight gain ($R^2 = 0.57$) over the time period. Both of these trends were significant. As the data was carried out further, although not presented here, it

appeared that performance plateaued about where this illustrated data set ended in terms of daily weight gain and feed conversion.

Trends are provided in Figures 3,4, 5 and 6 in terms of total medical treatments that include all respiratory, hoof and other interventions that required injectable antibiotics, mortality, pen population and final marketed weight. These measures would tend to affect ADG and F:G, but regarding these measures, there did not seem to be any strong trends or changes over time with these observations to indicate that these were indeed causative agents.

In terms of practical meaning, this ADG and F:G change over this period may be better understood as follows on a per head finished. Starting out we may want to standardize a few measures such as:

In Weight = 820 pounds
Out Weight = 1500 pounds
Ration Cost = $160 / ton dry matter
Yardage = $0.45 per head per day

Over this period of time this feedlot: lost 0.8 pounds of ADG. Required 2.5 pounds extra feed per pound of weight gain, or $136 more in feed cost per head, (1700 pounds of ration dry matter). Required 51 more days to reach market weight or $23 in yardage at the rate given above. The increase in production cost of $159 per head resulted.

Table 1. Summary of data

	% Treated	% Mortality	Head / Pen	ADG (lbs.)	F:G	Market Wt. (lbs.)
Average	7.9	0.6	158	3.26	7.55	1489
Std. Deviation	5.6	1.5	32	0.42	0.94	57
Minimum	0	0	60	2.28	5.57	1342
Maximum	26.9	11.0	226	4.11	9.96	1593
Slope	0.00074	0	-0.19	-0.021	0.045	-0.30
P value	0.10	0.82	0.54	1.2E-09	4.0E-10	0.63
Significant Trend	no	no	no	yes	yes	no

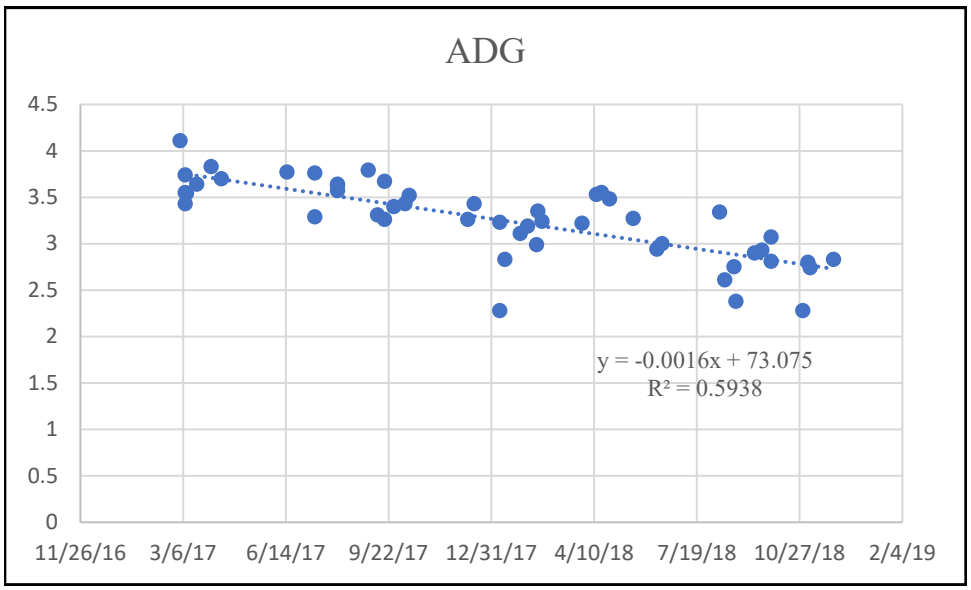

Figure 1. Average daily gain over time

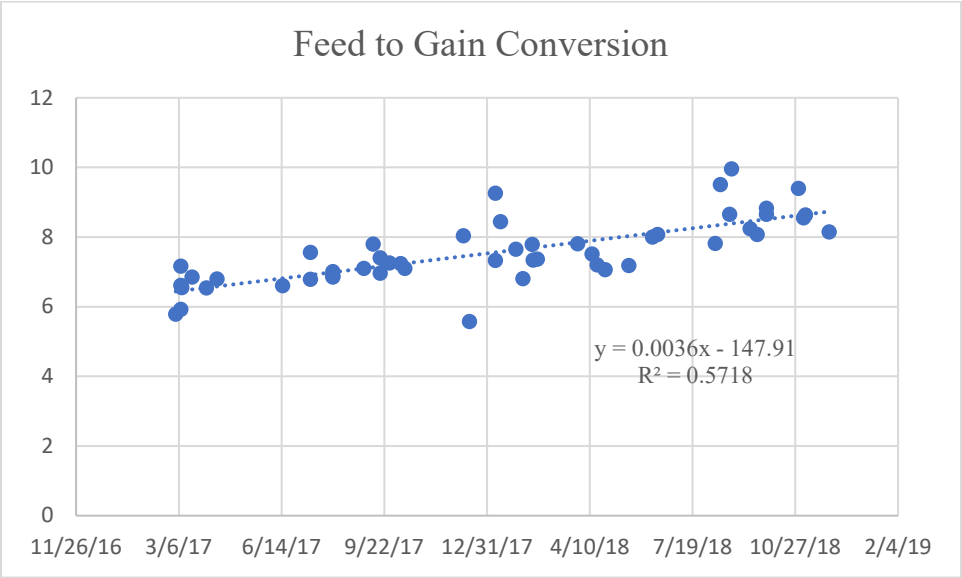

Figure 2. Feed to gain conversion over time

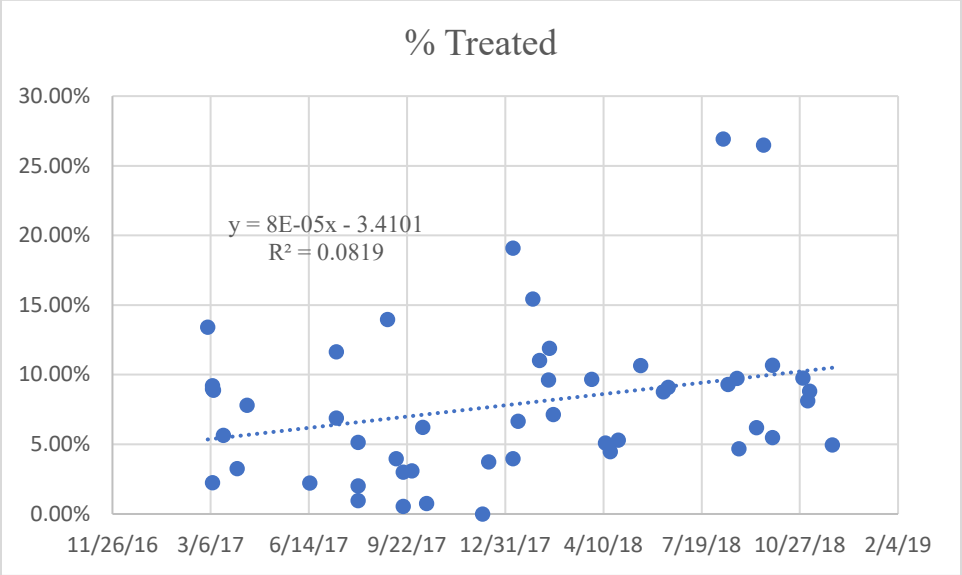

Figure 3. Medical treatments over time

Figure 4. Death loss over time

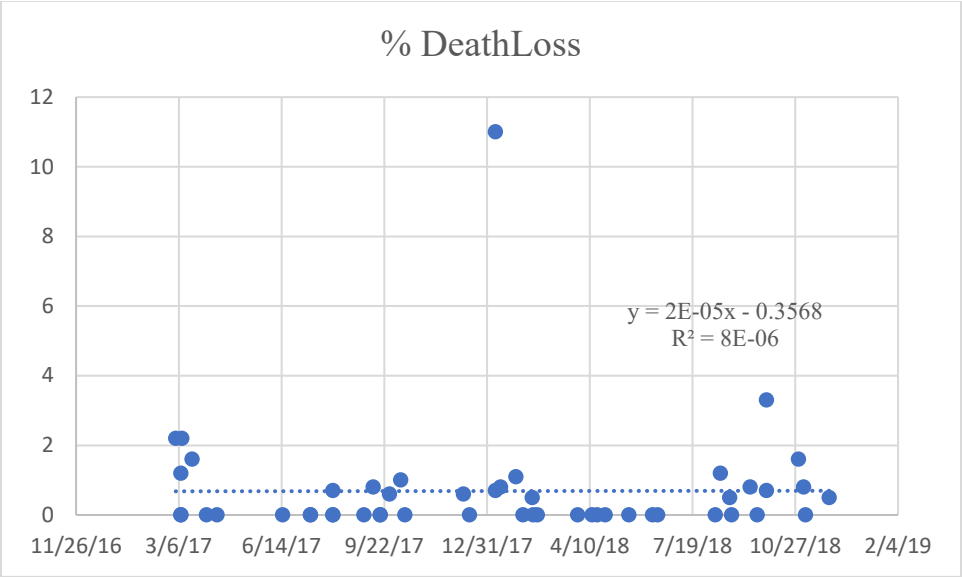

Figure 5. Pen head counts over time

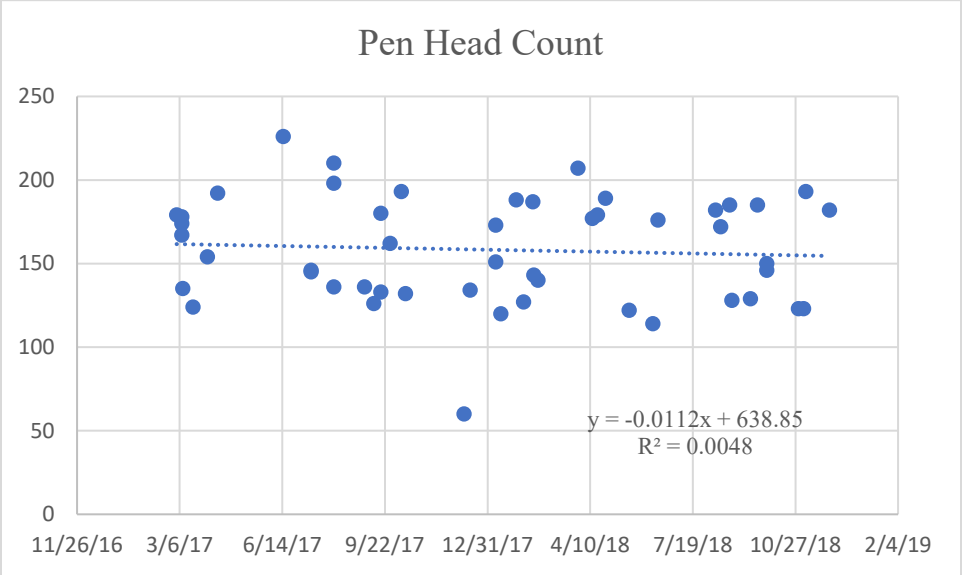

Figure 6. Market weights over time