

1981

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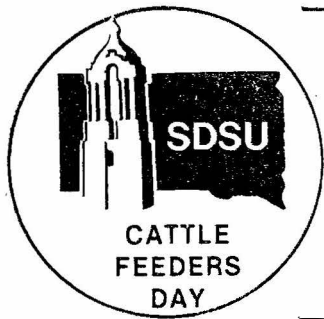
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### Recommended Citation

Kuhl, G.; Carlson, C.; Williamson, G.; and Embry, L., "Effect of Cement Dust and Reimplanting on Finishing Heifer Performance" (1981). *South Dakota Cattle Feeders Field Day Proceedings and Research Reports, 1981*. Paper 12.  
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## EFFECT OF CEMENT DUST AND REIMPLANTING ON FINISHING HEIFER PERFORMANCE<sup>1</sup>

G. Kuhl, C. Carlson, G. Williamson and L. Embry  
Department of Animal Science Report  
CATTLE 81-11

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### Summary

Eighty crossbred yearling heifers were used to determine the possible benefit of including 2% cement kiln dust in a typical high-concentrate finishing ration. The value of reimplanting with Ralgro during a 151-day feeding period was also evaluated.

Cattle on the cement dust ration gained 13% slower and ate 6.3% less feed per day than control heifers, resulting in an 8.5% poorer feed conversion with cement dust. Carcass quality and yield grades were not affected by cement dust in the ration.

In this study, no benefit was observed from implanting heifers twice during a 151-day feeding period as compared with a single implant in terms of finishing trial performance or carcass characteristics.

### Introduction

Recently, certain studies have indicated that including cement kiln dust, a waste by-product of the cement industry, in the rations of livestock may increase performance. However, the trials to date have been inconsistent, with some experiments finding no effect and others actually showing decreased performance by adding cement dust to rations. While the possible mode(s) of action of cement dust is unknown, several theories have been proposed, including its action as a buffer and as a source of certain trace minerals. It appears that considerable variation exists in the mineral composition and possible growing-promoting effects of cement dust from various states and plants.

The objective of this trial was to compare the performance of finishing heifers fed a high-concentrate ration with and without 2% cement dust from the South Dakota Cement Plant at Rapid City.

In addition, this study presented an opportunity to evaluate whether two successive Ralgro implants during a 151-day feeding period would promote better performance than a single initial implant.

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<sup>1</sup> Trial conducted at the Southeast South Dakota Experiment Farm, Beresford, South Dakota.

### Experimental Procedures

Eighty crossbred yearling heifers averaging about 780 lb. were used for this 77-day finishing study. The heifers had been utilized on a corn silage additive trial at the Southeast Farm prior to this experiment. The cattle were allotted to eight pens of 10 head each with shrunk body weights obtained after an 18-hour stand without feed and water. Four pens were assigned to the cement dust ration and four pens to the control ration. Two pens of cattle on each ration were reimplanted with Ralgro on the first day of the trial. All heifers had been implanted with Ralgro 74 days previously.

The control ration consisted of 80% whole shelled corn, 10% chopped, poor quality alfalfa hay, 5% wet beet molasses and 5% pelleted custom supplement. The cement dust ration was identical to the control ration, except the 2% cement dust and 78% corn were fed. The wet molasses was used in the rations to minimize fines and prevent separation of the cement dust from the rest of the ration. The custom mixed supplement contained 75% ground corn, 5% dry cane molasses, 11.7% limestone, 6% trace mineralized salt and 2.3% Rumensin-vitamin A premix. The premix provided 30,000 I.U. of vitamin A per pound of supplement and 30 grams of Rumensin per ton of complete ration. The cattle were slowly brought up on the high-concentrate rations by decreasing the hay and increasing the shelled corn over the first 12 days of the experiment.

Analyses of the major ration feedstuffs yielded the following average values for moisture and crude protein, respectively: alfalfa hay, 10.6% and 16.2%; shelled corn, 11.6% and 11.0%; and supplement, 10.0% and 9.6%. The cement dust which was obtained from the South Dakota Cement Plant stockpile in Rapid City contained .45% moisture, 33.9% calcium and .04% phosphorus.

The heifers were fed in open, sloped concreted lots without access to enclosed shelter. Daily feed records were kept on each pen and individual heifer weights were obtained at monthly intervals. The experiment was terminated after 77 days on feed, at which time the average full body weight of the heifers was about 1000 pounds. The cattle were sold on a grade and yield basis so that detailed carcass data could be obtained.

### Results

The feedlot performance and carcass characteristics of heifers as influenced by cement dust in the ration and by reimplanting is shown in the table. Averaged across implant groups, the daily gain of heifers on the control ration was 2.70 lb. compared with 2.32 lb. for the cement dust-fed cattle. Thus, feeding 2% cement dust in the ration decreased rate of gain by about 13%. Daily feed consumption was also decreased an average of 6.3% with cement dust, and the amount of feed required per pound of gain was increased 8.5%.

These results are consistent with recent Alabama and Oklahoma trials in which feedlot performance was decreased by adding 2 to 3% cement dust to high-concentrate finishing rations.

Carcass characteristics were not materially influenced by including cement dust in the ration, except for lower carcass weights and smaller rib eye areas associated with lower final body weights of the cement dust-fed heifers. Thus, there does not appear to be any advantage to adding

Table 1. Effect of Cement Dust and Reimplanting on Finishing Heifer Performance

Item	Single implant		Reimplanted	
	Control	Cement dust	Control	Cement dust
No. heifers	20	20	20	20
Initial shrunk wt., lb.	779.6	777.0	779.0	779.0
Final shrunk wt., lb.	999.8	960.2	974.2	952.0
Avg. daily gain, lb.	2.86	2.38	2.54	2.25
Avg. daily ration, lb. (as fed)				
Shelled corn	18.64	16.46	17.83	16.68
Chopped hay	3.86	3.62	3.76	3.68
Wet molasses	1.20	1.08	1.14	1.10
Supplement	1.17	1.06	1.12	1.08
Cement dust	--	.43	--	.44
Total	24.87	22.65	23.85	22.98
Lb. feed/lb. gain (as fed)	8.70	9.44	9.42	10.22
Hot carcass wt., lb.	607.4	578.4	589.8	580.2
Fat thickness, in. <sup>a</sup>	.40	.44	.39	.38
Rib eye area, sq. in.	11.74	11.35	12.25	11.92
Quality grade <sup>b</sup>	19.2	19.0	19.0	19.3
Yield grade	2.56	2.72	2.62	2.52
Percent liver abscesses	45	45	30	25

<sup>a</sup> Fat thickness measured over rib eye between the 12th and 13th ribs.

<sup>b</sup> Quality grade score: 18 = high good, 19 = low choice, 20 = average choice.

South Dakota cement dust to high-concentrate finishing rations, at least at levels approaching 2% of the ration. Indeed, this trial suggests that feedlot performance will be adversely affected. It should be noted that cement dust is not approved as a feed additive in livestock rations.

No feedlot performance benefit was achieved by reimplanting the heifers with Ralgro at the beginning of the 77-day finishing trial as compared to cattle receiving only one implant 74 days prior to the start of this trial. Indeed, rate of gain and feed efficiency of the cattle receiving two implants during the last 151 days on feed were somewhat lower. These results are in contrast to other studies which have shown a distinct advantage for reimplanting cattle when the feeding period was much over 150 days.

Overall, the crossbred heifers quality graded 82.5% low choice or better and yield graded over 76% number 1 and number 2.

per heifer daily. The Synovex-H implanted calves received a comparable commercial supplement at the same level but without MGA. Both supplements contained 32% crude protein, 4.0% calcium, 1.2% phosphorus, 3.5% salt and 20,000 I.U. vitamin A per pound.

Initial plans were to simply full feed the two silages along with the appropriate supplement. However, feed intake was rather poor with the sunflower silage, so 3 lb. of cracked corn per head daily was added to all rations as of the 11th day of the trial. The level of cracked corn was subsequently boosted to 5 lb. per head daily on January 22, in order to improve ration palatability and reduce the effects of the record low temperatures on animal performance.

The heifers were fed in open, sloped concrete lots without access to enclosed shelter. Daily feed records were kept on each pen of cattle and individual heifer body weights were obtained at monthly intervals throughout the 71-day trial.

### Results

The comparative feedlot performance of heifers fed either sunflower or corn silage and receiving Synovex-H or MGA is shown in the table. When averaged across growth stimulant groups, the sunflower silage ration resulted in about 28% slower gains (.86 vs. 1.20 lb.) than the corn silage ration. Daily feed intake was reduced considerably with the sunflower ration (32.6 vs. 47.1 lb. as fed) with about 28% less sunflower silage consumed than corn silage. Lower palatability and high oil content of the sunflower silage was likely responsible for the reduced intake. About one-half of the sunflower silage dry matter consisted of seeds which contained about 38% oil. Overall, feed conversion was not significantly affected by silage type. However, relatively more grain and supplement were required per pound of gain on the sunflower ration due to the lower intake and rate of gain with this silage compared to corn silage.

Further experimentation is needed with sunflower silage to determine the optimum stage of maturity for ensiling sunflowers and to evaluate different feed proportions and mixtures to improve sunflower silage palatability and feeding value. At present, it is suggested that sunflower silage be limited to less than one-half the total ration and mixed with highly palatable feeds to optimize cattle performance.

No material differences were observed between Synovex-H and MGA in terms of heifer gains, feed consumption or feed efficiency when averaged across silage types.

The Hereford-Angus cross heifers gained 13.4% faster than the Simmental-Angus cross calves with little differences in feed intake, resulting in over a 13% better feed conversion by the half-blood exotic heifers.

The extremely cold weather conditions during this trial resulted in greatly reduced feedlot performance by all groups of cattle.

Table 1. Comparison of Corn vs. Sunflower Silages With Growing Heifers Receiving Synovex-H or MGA

Item	Corn silage ration		Sunflower silage ration	
	Synovex-H	MGA	Synovex-H	MGA
No. of heifers	14	14	14	14
Initial shrunk wt., lb.	588.8	590.0	587.8	589.5
Final shrunk wt., lb.	670.2	678.1	652.6	647.9
Avg. daily gain, lb.	1.15	1.24	.91	.82
Avg. daily ration, lb. (as fed)				
Silage	41.9	42.4	27.5	27.8
Cracked corn	3.5	3.5	3.5	3.5
Supplement	1.5	1.5	1.5	1.5
Total	<u>46.9</u>	<u>47.4</u>	<u>32.5</u>	<u>32.8</u>
Lb. feed/lb. gain (as fed)				
Silage	36.6	34.2	30.3	34.7
Cracked corn	3.1	2.8	3.9	4.4
Supplement	1.3	1.2	1.6	1.8
Total	<u>41.0</u>	<u>38.2</u>	<u>35.8</u>	<u>40.9</u>