

# Evaluation of Beef Growing and Finishing Systems to Reduce Corn Use

## A. S. Leaflet R2413

Dan Loy, professor of animal science;  
Allen Trenkle, C. F. Curtiss distinguished professor of  
agriculture emeritus

### Summary and Implications

This study compared systems where cattle were maintained on a 60% wet distillers' grain diet (no grain) until slaughter or switched to a conventional grain-based finishing diet for 90 days. The third treatment was a conventionally finished group that had been fed a corn-hay backgrounding diet. There were no differences in the performance or carcass characteristics of the groups finished on the conventional grain diet. Of those two treatments, cattle backgrounded on the wet distillers' grain based diet utilized 22 bushels of corn per head throughout the 223 day feeding program compared to 43 bushels for the cattle backgrounded on the corn-hay diet. Cattle finished on the 60% wet distillers' grains diet used no corn, but gained slower, were lighter, leaner and had lower quality grades at the same number of days on feed. More research is needed to determine if more time on feed would maintain quality grades or a minimal number of days on feed is required.

### Introduction

Increased demand for corn from biofuels have increased the volatility in grain prices throughout 2008. In many cases corn may not be the lowest cost energy source for feedlot cattle. Systems that decrease grain use have not been evaluated in some time. One option is extended backgrounding programs utilizing wet corn co products such as distillers' grains.

### Materials and Methods

In a previous report in this document (A.S. Leaflet R2412), a backgrounding study was conducted to evaluate long term storage of wet distillers' grains. Two of the three treatments in that 112 day study used wet distillers' grains (WDG) at 60% of the ration dry matter and no grain. The third treatment was a conventional corn-hay-soybean meal based on backgrounding ration. This study is a report on the finishing phase for cattle used in that study and is designed to evaluate systems that finish cattle with minimal grain use. Cattle previously fed the 60% WDG-40% hay diet that was stored in the bunker were switched to a typical finishing ration (Table 1). Cattle fed the corn-hay-soybean meal control ration were also switched to the same conventional finishing ration. Cattle fed the 60% WDG diet that was mixed daily (no grain), was maintained on the same diet (Table 1). Therefore the treatment were conventional corn

backgrounding followed by finishing on a conventional corn diet (CONT), 60% WDG backgrounding with no corn followed by finishing with a conventional corn diet (SWITCH) and both backgrounding and finishing on a 60% WDG diet without corn (WDG). The cattle were adjusted to the new diets over an 11 day period, implanted with Component TE-S and fed for 90 days. At that time, all cattle were harvested at Tyson Foods in Denison, Iowa and carcass data collected. Data were analyzed using General Linear Models statement of SAS. Means were separated using orthogonal contrasts comparing corn vs no corn finishing diets, and backgrounding treatment within the two corn finishing diets.

### Results and Discussion

Cattle performance results are summarized in Table 2. Cattle that were maintained on the 60% WDG diet for the finishing phase were significantly lighter at slaughter compared to cattle that were fed a more conventional, grain based diet for 90 days. There were no differences in final weight between the two grain finishing treatments, regardless of backgrounding diet. Similar patterns were noted for finishing phase average daily gain and feed efficiency. Grain fed cattle gained faster and more efficiently than cattle fed 60% WDG during the finishing phase, with no difference between the two grain fed systems. There were no differences in dry matter intake during the finishing phase among the treatments. Over the entire 223 day, combined backgrounding and finishing phases, dry matter intake also did not differ. Average daily gain and feed efficiency over the combined phases were superior for cattle fed the grain diet during finishing. There were no differences in dry matter intake between treatments for the entire 223 day study. Total corn use was reduced from 44 bushels for the grain system (CONT) to 22 bushels for the SWITCH system. The WDG treatment used no corn.

Carcass characteristics by system are shown in Table 3. Cattle fed 60% WDG during the finishing phase had lighter carcass weights, a lower dressing percentage, less fat thickness, a lower yield grade and less marbling than cattle fed the conventional grain diet during finishing. There were no differences between the two grain finishing treatments for any of the carcass characteristics. Kidney heart and pelvic fat, and ribeye area did not differ between the three treatments. The carcass data suggests that the 60% WDG treatment was less finished than the grain treatment at 223 days on feed and should have been fed longer.

Extending the backgrounding system by utilizing diets high in wet corn co products is one way to reduce corn use while maintaining carcass quality. Systems that drastically

## Iowa State University Animal Industry Report 2009

reduce or eliminate corn use can reduce carcass quality and market readiness without increased days on feed.

**Table 1. Diets fed, 90 finishing phase.**

Ingredient	Conventional finishing diet	60% WDG diet
	-----Percent of dry matter-----	
Corn	61.67	--
Wet distillers' grains	22.23	59.40
Fescue hay, ground	13.21	38.24
Ground limestone	1.52	2.02
Molasses	1.02	--
Salt	0.25	0.25
Trace mineral premix	0.04	0.04
Vitamin A premix	0.04	0.04
Rumensin 80	0.02	0.02

**Table 2. Finishing and overall performance by system.**

	60 % WDG	60% WDG switched to Conventional finishing	Hay-grain back- grounding Switched to Conventional finishing	Std. error	Contrast WDG vs Corn finishing	Contrast WDG vs hay-grain back- grounding
Final weight	1176	1235	1239	19	<.04	NS
Finishing phase, 90 days						
Dry matter intake, lb	21.58	20.57	20.80	.94	NS	NS
Daily gain, lb.	2.68	3.72	3.92	.14	<.01	NS
Feed/gain	8.05	5.48	5.31	.36	<.01	NS
Overall, 223 days						
Dry matter intake, lb	18.05	17.86	18.29	.49	NS	NS
Daily gain, lb.	2.75	3.00	3.02	.09	<.05	NS
Feed/gain	6.54	5.95	6.05	.17	<.04	NS
Corn use, bu.	0	23	44			

**Table 3. Carcass characteristics by system.**

	60 % WDG	60% WDG switched to Conventional finishing	Hay-grain back- grounding Switched to Conventional finishing	Std. error	Contrast WDG vs Corn finishing	Contrast WDG vs hay-grain back- grounding
Hot carcass weight, lb.	694	747	742	11	<.01	NS
Dressing percent	59.0	60.7	60.0	0.4	<.03	NS
Fat thickness, inches	.40	.51	.47	.02	<.01	NS
Ribeye area, square in.	12.07	12.23	12.45	.18	NS	NS
Kidney, heart and pelvic fat, %	1.79	1.76	2.02	.12	NS	NS
Yield grade	2.64	3.07	2.91	.09	<.01	NS
Marbling score <sup>a</sup>	972	1058	1012	19	<.02	NS
Percent USDA Choice and higher	11	59	50			

<sup>a</sup>900=slight<sup>0</sup>, 1000=small<sup>0</sup>, 1100=modest<sup>0</sup>