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Feeding Value of Light-Test Weight Corn for Growing and Finishing Steers

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Summary

Light-test weight corn from two consecutive years at 47.7 and 45.9 lb per bu was compared to corn at 56.5 and 55.9 lb when fed to large-frame crossbred steer calves during a growing phase and a subsequent finishing phase in both years. Performance results from both years were similar, and after combining the data, steers gained as fast and as efficiently on the light-test weight corn as they did on the heavier corn during both the growing and finishing phases. When carcass data were combined for the two years, hot carcass weights were significantly greater for the light-test weight corn, but other measurements were similar. The data from these trials indicate that corn with a test weight as low as 45.9 lb per bu has equal feeding value to normal U.S. No. 2 corn for cattle on growing and finishing diets.

Introduction

When a corn growing season is not long or warm enough for corn to reach full maturity, the test weight can fall substantially below the standard. Currently the top market price is based on No. 2 corn, which in the U.S. is 54 lb per bu. Most grain dealers and beef feedlot operators will discount the corn price by increments as test weights fall below the standard U.S. No. 2, indicating that feed value is less. However, feeding trials over the years with light-test weight corn in poultry and swine diets and with grain sorghum fed to cattle have generally shown little difference in feed value from normal test-weight corn or milo when compared on an equal weight basis. There is little research data on the feed value of light-test weight corn for growing or finishing cattle. Because of early frost and a cool growing season, light-test weight corn was available from the 1992 and 1993 corn crops in the Nebraska Panhandle. Consequently, feeding trials were conducted to compare the light-test weight corn to normal corn in two growing trials with steer calves fed a moderate level of grain, and during subsequent finishing trials when a high level of grain was fed.

Procedure

Light-test weight corn was evaluated during two consecutive years in growing and finishing diets for crossbred, large-frame steer calves. The source of the calves was the same in both years. In years 1 and 2, there were 6 pens of 12 and 4 pens of 11 steers, respectively, on each treatment. Test weight comparisons were 56.5 to 47.7 and 55.9 to 45.9 lb per bu in years 1 and 2, respectively. The light-test weight corn was purchased from a single source the first year and from two sources the second year. The control corn was produced at the Panhandle Research and Extension Center. Test weights were determined by a Dickey-John Grain Analysis Computer II. The growing diet dry matter fed in both years consisted of 32.9% corn silage, 22.3% alfalfa haylage, 37.0% dry rolled corn and 7.8% supplement providing Rumensin and minerals. In both years, final finishing diet dry matter consisted of 9.2% corn silage, 86.2% dry rolled corn and 4.6% protein supplement. The corn was coarsely processed with a roller mill. The rollers were set the same for both test weights of corn. The roller adjustment was such that approximately 90% of the light-test weight corn was broken at least once.

The rations were calculated on a dry matter basis to contain 14.8% crude protein and .50 Mcal/lb NEg in the

Table 1. Corn comparisons for two years of feeding trials

Corn	Normal	Light
Year 1		
Corn test wt/bu, lb	56.5	47.7
Corn moisture, %	11.7	13.4
Corn DM protein, %	9.8	10.2
Year 2		
Corn test wt/bu, lb	55.9	45.9
Corn moisture, %	14.3	15.4
Corn DM protein, %	8.6	9.9

Table 2. Two years of performance data for light-test weight corn fed to growing steers

Corn	Normal	Light	SEM
Year 1, 71 days			
No. of steers	73	72	
No. of pens	6	6	
Initial wt, lb	598	597	
Daily gain, lb	2.49	2.51	0.050
Feed DM/day, lb	16.5	16.8	0.25
Feed/gain	6.65	6.70	0.14
Year 2, 105 days			
No. of steers	45	44	
No. of pens	4	4	
Initial wt, lb	614	632	
Daily gain, lb	2.39	2.49	0.056
Feed DM/day, lb	17.2	17.8	0.28
Feed/gain	7.16	7.12	0.16
Combined data, 2 years			
No. of steers	118	116	
No. of pens	10	10	
Initial wt, lb	604	610	
Daily gain, lb	2.46	2.51	0.055
Feed DM/day, lb	16.8	17.2	0.27
Feed/gain	6.85	6.86	0.15

Table 3. Two years of performance data for light-test weight corn fed to finishing steers

Corn	Normal	Light	SEM
Year 1, 182 days			
No. of steers	73	71	
No. of pens	6	6	
Final wt, lb	1267	1287	
Daily gain, lb	2.71[a]	2.83[b]	.038
Feed DM/day, lb	18.7	18.3	.24
Feed/gain	6.92	6.47	.13
Year 2, 135 days			
No. of steers	44	43	
No. of pens	4	4	
Final wt, lb	1337	1381	
Daily gain, lb	3.50	3.61	.048
Feed DM/day, lb	23.5	22.7	.29
Feed/gain	6.65	6.32	.16
Combined data, 2 years			
No. of steers	117	114	
No. of pens	10	10	
Final wt, lb	1294[c]	1324[d]	
Daily gain, lb	3.12	3.22	.043
Feed DM/day, lb	21.1	20.5	.26
Feed/gain	6.79	6.40	.15

[ab]Means differ (P<.05).
[cd]Means differ (P<.1).

Table 4. Two years of carcass data for light-test weight corn fed to growing and finishing steers

Corn	Normal	Light	SEM
Year 1, total 253 days			
Hot carcass wt, lb	785	798	
Dressing percent	64.0	64.2	0.001
Fat thickness, in	.41[a]	.45[b]	0.010
Marbling score	6.09	6.01	0.098
Rib eye area, sq in	12.1	12.2	0.091
Yield grade	3.16[c]	3.20[d]	0.044
Year 2, total 240 days			
Hot carcass wt, lb	829	856	
Dressing percent	62.7	63.0	0.001
Fat thickness, in	.44[c]	.40[d]	0.013
Marbling score	5.89	5.88	0.126
Rib eye area, sq in	14.0	14.9	0.117
Yield grade	2.77	2.48	0.057
Combined data, 2 years			
Hot carcass wt, lb	802[c]	821[d]	5.0
Dressing percent	63.5	63.7	0.001
Fat thickness, in	.42	.43	0.011
Marbling score	6.01	5.96	0.11
Yield grade	2.95	2.92	0.50
Rib eye area, sq in per cwt of hot carcass wt	1.60	1.61	

[ab]Means differ (P<.05).
[cd]Means differ (P<.1).
[e]Marbling scores: Small = 5.0, modest = 6.0.

growing diet and 11.4% crude protein and .66 Mcal/lb NEg in the finishing diet. The calculations assumed corn to contain 9.0% crude protein (dry matter basis). Actual chemical analyses for the corn at both test weights in both years are shown in Table 1. The corn generally contained higher levels of protein than initially assumed, so the rations contained slightly higher protein levels than calculated. The crude protein percentages in the finishing rations were 12.0, 12.4 and 11.0, 12.1 for normal and light weight corn in trials 1 and 2, respectively. Rumensin was included in both diets and the steers were implanted with Synovex at the start of the growing and finishing periods.

Carcass measurements were taken at slaughter and final live weight were calculated by dividing hot carcass weights by a common dressing percentage (62). Using statistical procedures described in SAS (1988), performance and carcass data were analyzed for each year as well as for a combined basis for the two years which involved 10 pens on each treatment.

Results

In the two growing trials of 71 and 105 days, there were no significant differences in daily gain, dry matter feed intake, or feed required per unit of gain in large-frame steer calves fed normal or light-test weight corn (Table 2). Thus combining the data for the two years resulted in 10 pens on each corn with similar performances during the growing phase, feeding a diet that contained 37% dry rolled corn.

The finishing trials that followed the growing trials were for 182 and 135 days in years 1 and 2, respectively. Daily gains were improved (P<.05) on the light-test weight corn in year 1, but not in year 2 and not in the combined data for the 2 years (Table 3). Treatment differences for dry matter feed intake and feed required per unit of gain were not statistically significant for years 1 and 2 or the combined data.

Carcass comparisons are shown in Table 4. Hot carcass weight was significantly greater (P<.05) for the light-test weight corn in the combined data. The other measurements in the combined data were similar, including rib eye area when expressed as sq in per hundredweight of hot carcass weight.

Data from these trials indicate that when test weight of corn is at least 46 lb per bu, the feeding value is equal to normal U.S. No. 2 corn, which is in agreement with steer metabolism data from Birkelo et al. (1994 South Dakota Beef Report, pp. 2-5) and data from swine and poultry trials.

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