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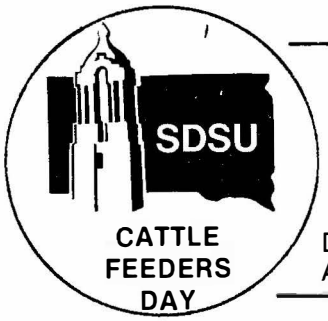

UTILIZATION OF DROUGHT-STRICKEN CORN SILAGE BY YEARLING STEERS

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Corn silage is a very versatile and palatable feed that fits well into many cattle feeding programs. Insufficient rainfall in several areas of the country in recent years has resulted in many additional acres of corn being ensiled due to the low potential grain yield. Harvesting drought-stricken corn as silage results in at least partial salvage of the crop. However, many farmers have expressed concern about the feeding value of drought-damaged corn silage and how it can be best incorporated into feedlot rations for optimal performance and maximal economic return.

Corn silage typically contains a considerable amount of grain. However, the amount of grain in silage may vary from essentially none from a severely drought-stricken crop to as much as 50% of the silage dry matter from a high-yielding corn crop. In view of the large difference in energy values of corn fodder and corn grain, the energy values of silage-based rations would be expected to be influenced to a considerable degree by the proportion of grain in the corn silage. However, when the corn plant fails to produce ears, or when grain yield is markedly reduced, there is some concentration of available nutrients in the stalk and leaves. Even though much research has been conducted with corn silage fed to growing and finishing cattle, questions still remain as to the most appropriate amount of additional corn grain to feed with silage, especially when the silage contains minimal amounts of grain.

The objective of this study was to examine the feedlot performance of cattle fed whole-plant drought-stricken corn silage with varying levels of added corn grain.

Procedures

Sixty-four yearling Hereford-Angus steers averaging about 550 lb. were purchased at a local sale barn for the experiment initiated on February 17, 1977 at the Southeast Experiment Farm near Beresford. The cattle were allotted into 8 pens of 8 head each on the basis of shrunk weight obtained after an 18-hour stand without feed and water.

Four treatments representing different levels of added cracked corn were studied, with 2 pens assigned to each treatment. The 4 experimental rations were as follows:

Treatment	Dry Matter Basis		As Fed Basis	
	Corn Silage	Corn Grain	Corn Silage	Corn Grain
#1	100%	---	100%	---
#2	75%	25%	88%	12%
#3	50%	50%	72%	28%
#4	25%	75%	46%	54%

The corn silage was from drought-stricken corn with an estimated grain yield of 4-5 bushels/acre and a silage yield of 3-3.5 tons/acre. Average dry matter content of the silage was about 34% with an average protein content of 10.9%, dry basis. The corn grain was purchased locally as needed and averaged 13% moisture.

A custom mixed 32% crude protein supplement was fed at the rate of 2 lb. per head daily throughout the trial. The composition of the supplement was 18% ground corn, 68% soybean meal (44% protein), 7% dicalcium phosphate, 2% limestone, 5% trace mineral salt and a vitamin A (10,000 IU/lb. suppl.) and Rumensin premix. The level of Rumensin in the supplement was adjusted periodically in order to maintain the equivalent of about 30 g. of Rumensin per ton of air-dry feed in all rations.

The cattle were vaccinated for blackleg, malignant edema and red nose (IBR) and implanted with Synovex-S at the beginning of the experiment.

The cattle on the 100% corn silage ration were full-fed silage from the beginning of the experiment, whereas the steers on the other treatments were gradually brought up to a full feed of grain and corn silage. The increase to full feed on the high-grain (75% cracked corn, dry basis) ration was accomplished over a 10-day period. The cattle were fed in open, sloped concrete lots without access to shelter. The cattle were weighed at monthly intervals throughout the trial, with daily feed records kept on each pen.

The experiment was terminated for each treatment group when their average full body weights approached 1150 lb. The cattle were marketed on a grade and yield basis so that detailed carcass measurements were obtained.

Results

The results of the trial are presented in Table 1. Average final shrunk body weights were 1082, 1113, 1140 and 1106 lb. for the cattle fed 100, 75, 50 and 25%, respectively, of their ration dry matter as drought-stricken corn silage. Percent shrink resulting from an 18-hour stand without feed and water tended to be greater on the high-silage rations.

As expected, cattle on the all-silage ration required the longest time on feed (286 days), while the high-grain fed steers took the least time (208 days). The overall daily gains (based on shrunk initial and final body weights) of the 4 experimental treatments were 1.94, 2.24,

2.57, and 2.76 lb. for the 100, 75, 50 and 25% corn silage rations, respectively. The daily gains achieved by the high-silage fed steers tended to fall off more sharply than that of their high-grain fed counterparts as the cattle approached finished weights. This observation appeared to be related in part to the erratic late fall climatic conditions to which only the high-silage fed steers were exposed. The cattle were somewhat overfinished at slaughter, as can be observed from the tabulated carcass data. The nutritional impact of carrying cattle too long is a substantially increased maintenance energy requirement along with excessive fat deposition, thereby resulting in depressed terminal performance. For example, the average daily gains (based on filled feedlot weights) achieved on the experimental rations up to mean body weights of 1025-1050 lb. were 2.30, 2.46, 2.78 and 2.99 lb. for the 100, 75, 50 and 25% corn silage rations, respectively.

The average daily feed consumption results are also shown in Table 1. Based on these data, the average dry matter intakes of the 4 sets of steers were 19.54, 20.96, 22.12 and 20.93 lb. for the 100% through 25% corn silage rations, respectively. The amount of feed required per 100 lb. gain is also presented in the table. Using data of this type, one can calculate the feed costs per 100 lb. gain based on any given set of feed prices. For example, if we value drought-stricken corn silage at $15/ton, #2 corn at $2.00/bushel and the 32% protein supplement at $150/ton, including handling and processing, then the feed costs per 100 lb. gain of these cattle would have been $28.51, $30.03, $31.21 and $30.62 for the 100, 75, 50 and 25% corn silage rations, respectively.

The carcass results are shown at the bottom of the table. Dressing percent (warm carcass weight/final filled weight x 100) decreased with increasing levels of corn silage in the ration a result primarily attributable to the greater gut fill associated with increasing amounts of roughage in the ration. Level of corn silage feeding appeared to have little influence on carcass fat thickness, rib-eye area, quality or yield grade independent of carcass weight differences. The cattle on all rations graded an average of low choice or higher. Carcass maturity, firmness, rib-eye color, % kidney fat and the incidence of liver abscesses were not significantly related to the level of corn silage feeding.

Table 1. Utilization of Drought-Stricken Corn as Silage

	Percent Corn Silage in the Ration Dry Matter[a]			
	100%	75%	50%	25%
No. Animals	16	16	16	16
Days on Feed	286	260	238	208
Initial Shrunk wt., lb.	527	529	529	530
Final Shrunk wt., lb.	1082	1113	1140	1106
Avg. Daily Gain, lb.	1.94	2.24	2.57	2.76
Avg. Daily Ration, lb.				
Corn Silage	53.7	42.7	30.4	14.4
Corn Grain	--	5.8	11.8	16.5
Supplement	2.0	2.0	2.0	2.0
Feed/100 lb. Gain, lb.:				
Corn Silage	2771	1900	1186	524
Corn Grain	--	257	461	596
Supplement	103	88	78	72
Carcass Wt., lb.	645	689	718	719
Dressing Percent	58.1	59.7	61.6	63.0
Fat Thickness, in.[b]	0.67	0.82	0.82	0.85
Rib Eye Area, sq. in.	11.20	11.35	11.88	12.25
Yield Grade	3.63	4.21	4.18	4.12
Quality Grade[c]	19.2	20.2	20.8	19.7

[a]Balance of ration composed of cracked corn, plus 2 lb/head/day of supplement.

[b]Measured over rib eye between 12 and 13th rib.

[c]19=Low Choice; 20=Avg. Choice.

Summary and Conclusions

Sixty-four yearling black-baldy steers (16 per treatment) were fed four rations consisting of 100, 75, 50 and 25% corn silage (dry matter basis) with the balance of the ration being made up of cracked corn, in order to examine the feedlot performance of cattle fed drought-damaged corn silage supplemented with various levels of added grain. All cattle received 2 lb. of a 32% protein meal per head daily in order to provide supplemental protein, minerals, vitamin A and Rumensin.

Results of this experiment illustrate that good performance can be obtained by feeding drought-stressed corn silage to growing and finishing cattle. Average daily gain ranged from 1.94 lb. on the all corn silage ration to 2.76 lb. on the highest grain ration. Based upon this experiment and other studies conducted at this station and elsewhere, the feeding value of drought-stricken corn silage will usually be within 75-95% of normal corn silage, depending upon the length, timing and severity of drought damage. This indicates that while drought-stressed corn silage is low in grain content, a higher than normal amount of available energy must be present in the stalks and leaves in order to support the level of performance observed. Thus, the major impact of drought conditions on the ensiled corn crop is that of reduced tonnage per acre and increased harvesting costs per ton rather than on a markedly decreased feeding value.

Carcass measurements revealed little influence of level of added grain in the ration on carcass characteristics when differences in carcass weight were taken into account.

This experiment indicates that drought-damaged corn silage will likely be higher in crude protein than normal. The crude protein content of the corn silage averaged 10.9% (dry basis) in this trial, as compared with 8.0-8.5% commonly found in normal corn silage. Because of this, farmers are advised to have their corn silage analyzed for protein so that rations can be properly formulated with only the minimum protein supplementation necessary.

This study demonstrates that drought-stricken corn silage can be effectively utilized in feedlot rations as a means of salvaging a poor corn grain crop while at the same time permitting more complete utilization of the forage and grain from an acre of corn.