wheat straw to look fuller; however, an increase in incidence of bloat was not observed.

Results from this study suggest that wheat straw can be successfully utilized as a roughage in finishing rations and should be considered when available at a price below that of cottonseed hulls or other similar roughages.

A Comparison of Corn Processing Methods, Several Levels of Corn Silage, and Sorghum Stover Silage versus Corn Silage for Finishing Steers

Jerry Martin[2], Raymond Peck[2], Milton England[2], Jack Alexander[2], and Robert Totusek[3]

Story In Brief

Three methods of processing corn were compared. High-moisture-harvested ground corn and ground-reconstituted corn were utilized 11.0 and 6.5 percent more efficiently than dry ground corn.

A ration containing 20 percent corn silage did not produce faster gains but was utilized 14.5 percent more efficiently than a ration containing 20 percent sorghum stover silage.

Rations containing 20 and 50 percent corn silage were similar in terms of cost of gain and carcass grade, but the 20 percent silage ration had an advantage in rate and efficiency of gain. An 80 percent silage ration produced economical gains, but carcass grades indicated a longer feeding period would have been desirable.

[1]Experiment conducted at Panhandle State College, Goodwell.
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Introduction

Corn silage is fed in significant quantity to feedlot cattle in irrigated areas of the Southwest. The percentage fed varies with the feedlot stage of the cattle and with other factors but the amount of corn silage used varies from as much as 80 percent to as little as 5 to 10 percent of the ration. The usual practice is to rapidly decrease the percentage of corn silage in the ration to a very low level for the major portion of the feeding period. Information is needed concerning the value of modern rations containing widely different levels of silage throughout the feeding period.

Although much of the irrigated corn acreage is utilized for corn silage production, an increasing acreage is being used each year for corn grain production. Under the proper management it is considered to be very competitive with the irrigated grain sorghums. Considering this trend to increased production and feeding of corn grain, it is important to evaluate the different methods available for harvesting and preparing corn grain for feedlot cattle so that the greatest yields of beef can be obtained per acre of corn produced. Furthermore, most corn in the Southwest is irrigated, and it is imperative to make the most efficient possible use of this depletable resource.

Materials and Methods

Eighty-nine head of yearling steers were used in this study to determine:

1. The feeding value of ground dry corn, high-moisture-harvested ground corn, and ground-reconstituted corn.
2. The net value of rations containing widely different levels of corn silage.
3. The feeding value of sorghum fodder silage compared to corn silage.

Using weight and grade as the criteria, five steers were selected from the group for the purpose of obtaining initial body composition data. The remaining 84 steers were divided by weight into 12 groups of seven steers each. These 12 groups were divided into two replications of six groups each and the groups within replication assigned at random to one of six ration treatments. The ration treatments are shown below.

(1) Dry ground corn + 20 percent sorghum stover silage[1] + protein supplement.

(2) Dry ground corn + 20 percent corn silage[1] + protein supplement.

(3) Dry ground corn + 50 percent corn silage[1] + protein supplement.

[1]Percent of the daily dry matter intake of the steers.

(4) Dry ground corn + 80 percent corn silage[1] + protein supplement.
(5) High-moisture-harvested ground corn + 20 percent corn silage[1] + protein supplement.
(6) Ground-reconstituted corn + 20 percent corn silage[1] + protein supplement.

The ingredient makeup of the protein supplement, fed at a level of 1.5 pounds per steer daily, is shown in Table 1. Each steer received two 15 mg. stilbestrol implants at the beginning of the trial.

With the exception of the corn used in combination with the sorghum stover silage (Treatment 1), the corn used in all ration treatments was produced from the same field. The high-moisture-harvested corn was harvested when the moisture content of the grain was approximately 30 percent. The remaining corn was allowed to dry in the field to a moisture content of about 15 percent and harvested to provide corn used for the dry and reconstituted corn treatments. The high-moisture-harvested corn was ground and ensiled in a small concrete-lined trench silo. The reconstituted corn was prepared by grinding the corn and then adding water to the ground grain as it was augered into the silo for ensiling. The dry corn was ground as needed. All grains were ground with a hammermill utilizing a one-fourth inch screen. All of the corn silage used in the study came from the same field and was stored in one silo. Samples of the feed constituting the different treatments were collected periodically during the study for dry matter determinations and proximate analysis. The average moisture content of feeds is shown in Table 2.

At the end of a 117-day feeding period, all steers were slaughtered and specific gravity determinations were made. Carcass data obtained included quality grade, loin eye area, fat thickness over the loin eye, and percent kidney and pelvic fat.

Table 1. Ingredient Makeup of Supplement

Ingredient	Percent of mix
Soybean meal (44%)	40.0
Dehydrated alfalfa meal (17%)	35.0
Urea (45% nitrogen)	10.0
Stock salt	5.0
Dicalcium phosphate	2.0
Calcium carbonate	6.0
Premix[1]	1.2
Aurofac 10	0.8
	100.0

[1] Source of Vitamins A, D, and E.

Table 2. Percent Moisture of Feeds[1]

	High moisture harvested corn	Reconstituted corn	Dry corn	Corn silage	Sorghum stover silage
Moisture, %	29.21	32.26	16.15	63.81	58.19

[1] Each value based on 16 samples taken at regular intervals during the feeding period.

Results and Discussion

The performance data for the 117-day feeding trial is shown in Table 3.

Average daily gain for the steers fed corn processed by different methods was very similar. The cattle fed high-moisture-harvested corn consumed less air dry feed than the cattle fed dry corn and were 11.0 percent more efficient than the latter group. This is in agreement with previous work with high-moisture-harvested corn at this station.

The efficiency of gain on reconstituted corn was 4.8 percent poorer than on the high-moisture-harvested corn but 6.5 percent better than on dry corn. Previous research at this station has similarly shown that grinding milo previous to reconstitution is less effective than reconstituting the whole grain or high-moisture-harvesting.

Using the feed prices shown in Table 3, the high-moisture-harvested corn produced the most economical gains followed by reconstituted and dry corns.

The steers fed 20 percent corn silage gained only 0.13 pounds more per day than those fed 20 percent sorghum silage but were considerably more efficient and economical in their feed utilization. There was also a difference in quality grade (Table 4) in favor of the corn silage fed steers. Only 50 percent of the steers fed sorghum stover silage graded choice while 85.7 percent of the steers fed corn silage graded choice. In previous trials there has been little difference between dry sorghum stover and corn silage when fed at 20 percent of the ration dry matter. Perhaps a low quality of roughage is more effective in a dry form. However, the quality of the sorghum stover silage used in this trial was rather poor.

Steer gains tended to decrease as the level of silage increased, especially at the 80 percent silage level. However, gains were respectable considering the lower quantities of corn grain consumed. Feed intake was greatest for the 50 percent silage group and lowest for steers fed 80 percent silage. Feed efficiency was best for the 20 percent silage treatment and similar for the 50 and 80 percent silage groups. The equal values for efficiency of gain between the 80 and 50 percent corn silage groups is somewhat misleading as indicated by the average quality grade (Table 4)

Table 3. Feedlot Performance Data (117 Days)

	Dry ground corn, 20% sorghum stover silage	Dry ground corn, 20% corn silage	Dry ground corn, 50% corn silage	Dry ground corn, 80% corn silage	High-moisture harvested ground corn, 20% corn silage	Ground reconstituted corn, 20% corn silage
No. steers	14	14	14	14	14	14
Initial wt., lb.	776	776	776	778	778	780
Final wt., lb.	1122	1138	1118	1069	1130	1122
Daily gain, lb.	2.96	3.09	2.92	2.49	3.02	2.92
Daily feed intake, lb.[1]						
Corn	19.68	16.77	11.02	2.59	14.42	14.63
Silage	4.83	4.99	12.92	17.58	4.27	4.44
Supplement	1.50	1.50	1.50	1.50	1.50	1.50
Total	26.01	23.26	25.44	21.67	20.19	20.57
Feed/lb. gain, lb.[1]	8.82	7.54[2]	8.73	8.70	6.71[3]	7.05[4]
Feed cost/cwt. gain, $[5]	20.28	17.79	17.27	13.64	16.07	16.82

[1] All values expressed on 90% dry matter basis.
[2] 14.5 percent more efficient than sorghum stover silage.
[3] 11.0 percent more efficient than dry corn.
4.8 percent more efficient than reconstituted corn.
[4] 6.5 percent more efficient than dry corn.
[5] Feed Prices

Dry ground corn	$ 2.40/cwt.	Corn silage	$10/ton
High-moisture-harvested ground corn	2.05/cwt.	Sorghum Stover Silage	7/ton
Ground-reconstituted corn	1.96/cwt.	Protein Supplement	3.67/ton

Price of grains and supplement includes $ .15/cwt. processing and mixing charge.

Table 4. Carcass Data

	Dry ground corn, 20% sorghum stover silage	Dry ground corn, 20% corn silage	Dry ground corn, 50% corn silage	Dry ground corn, 80% corn silage	High-moisture harvested ground corn, 20% corn silage	Ground reconstituted corn, 20% corn silage
No. Steers	14	14	14	14	14	14
Final live wt., lb.	1122	1138	1118	1069	1130	1122
Hot carcass wt., lb.	708	719	714	666	712	716
Chilled carcass wt., lb.	695	706	702	656	706	703
Dressing percent	63.1	63.2	63.9	62.3	63.0	63.8
Quality grade						
No. choice	7	12	12	9	11	12
No. good	7	2	2	5	3	2
Percent choice	50.0	85.7	85.7	64.3	78.6	85.7

of the two groups. Approximately 86 percent of the carcasses from the 50 percent corn silage group graded choice while only about 64 percent of those from the 80 percent corn silage group graded choice. This would tend to indicate that 50 percent corn silage steers were fatter. The 80 percent silage steers undoubtedly needed a longer feeding period. It is interesting to note that the 50 percent silage steers graded as well as the 20 percent silage group and made slightly cheaper gains. The gains of the 80 percent silage group were very economical, but the cattle obviously were not finished.

The net energy values of feeds compared in this trial will be reported later.

Whole Corn vs. Ground Corn vs. Rolled Corn For Finishing Cattle[1]

Jerry Martin[2], Milton England[2], Jack Alexander[2], Ted Montgomery[2], Donald G. Wagner[3] and Robert Totusek[3]

Story In Brief

Whole corn, ground corn, and rolled corn were compared in feedlot rations for steers using sorghum silage as the roughage source and a conventional supplement. During a 140-day feeding trial, differences in rate of gain and feed efficiency were small. Steers fed either the ground or rolled corn consumed one pound more air-dry feed daily than those fed whole corn but were no more efficient in their feed utilization.

The feed cost of grain was lowest for the steers receiving the whole corn due primarily to no processing cost charges against whole corn. The lower cost of gain for the whole corn resulted in a cost advantage of $6.80 and $3.60 compared to rolled and ground corn, respectively.

Introduction

The cost of grain processing for finishing cattle is always of major concern to the cattle feeder, since a small reduction in feed processing

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