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Milo Stover, Forage Sorghum, Prairie Hay,
Soybean Meal and Urea Compared for Growing Heifers

Keith Bolsen, Jim Oltjen and Harvey Ilg

Summary

Milo stover silage, prairie hay or forage sorghum silage was fed in rations containing 10, 12 or 14% protein from soybean meal (SBM) or 12% protein from urea; 100 heifers were fed in the 78-day growing trial (November 11, 1977 to February 2, 1978).

Heifers fed forage sorghum silage, prairie hay or forage sorghum silage + prairie hay had similar rate and efficiency of gains; those fed milo stover silage made slowest and least efficient gains. Rations containing prairie hay were consumed in the greatest amounts. Feeding rations with 12 or 14% protein from SBM gave better performance than rations with 10% protein from SBM. Heifers fed urea gained slower and less efficiently than those fed SBM. Gain from a ration containing equal parts of milo stover silage and forage sorghum silage exceeded predicted gain by 7.8%, and efficiency was 13.9% better than predicted.

Introduction

Milo stover and forage sorghum silages were compared in five previous heifer growing trials at this station (Prog. Rpt. 210, 230, 262, 291 and 320, Kansas Agr. Expt. Sta.). Results show: (1) growing calves fed milo stover silage should gain about 1.0 lb. per day and require 10 to 14 lbs. of dry matter per lb. of gain, (2) milo stover silage has a feeding value of 65% of that of forage sorghum silage, (3) milo stover silage fed in combination with forage sorghum silage is better feed than milo stover alone for growing calves, (4) supplying supplemental protein in milo stover silage rations is a large cost because stover usually contains so little protein, and (5) at least 12% protein rations are needed for maximum rate and efficiency of gain.

This trial was to verify previous results from feeding milo stover and forage sorghum silages, to evaluate prairie hay and to compare three levels of supplemental protein from soybean meal and one from urea.

Experimental Procedure

Shown below are the forage and protein rations compared in a 78-day growing trial (November 11, 1977 to February 2, 1978).

<u>Forages</u>	<u>Protein, % of the ration from (SBM)</u>	<u>Protein, % of the ration from urea</u>
Milo stover silage (MSS)	10, 12 and 14	12
Prairie hay (PH)	10, 12 and 14	12
Forage sorghum silage (FSS)	10, 12 and 14	12
½ MSS + ½ FSS	10, 12 and 14	12
½ PH + ½ FSS	10, 12 and 14	12

The 100 heifer calves averaged 430 lbs. when allotted by breed and weight into 20 pens of five each. Breeds included Angus, Hereford, Angus x Hereford and Hereford x Simmental. Four pens were assigned to each of the 5 forage treatments. All rations were 73% of the appropriate forage and 27% rolled milo plus protein supplement on a dry matter basis and formulated to be equal in minerals, vitamins and additives. All were mixed and fed to appetite twice daily.

All calves were fed 2 lbs. of rolled milo and alfalfa hay free-choice for 5 days before initial weighing and all were fed the same amount of experimental ration for 2 days before final weighing. All feed and water were withheld 16 hours before weights were taken.

Forage sorghum was a high-grain variety harvested in the dough-stage at 70 to 72% moisture. Milo stover was from dryland milo that had been harvested about 30 days before stover was harvested. The stover was about 70% moisture when the grain was harvested. The forage sorghum and milo stover silages were stored in concrete silos (10 ft. x 50 ft.). The native prairie hay was swathed and field-dried before being baled into rectangular bales about 75 to 80 lbs. each, and later processed in a tub grinder before being fed.

Results

Dry matter (%), crude protein (% DM basis) and crude fiber (% DM basis), respectively, for the three forages were: 28.0, 8.0, 31.0 for milo stover silage; 88.0, 5.5, 32.6 for prairie hay; and 28.5, 8.9, 26.3 for forage sorghum silage.

There were no interactions between forage and protein. Performances of heifers fed each of the five forages (averaged across protein treatments) are shown in Table 10.1; performances of heifers fed each of the four protein treatments (averaged across forages), in Table 10.2.

Heifers fed forage sorghum silage, prairie hay or FSS + PH had similar rates of gain. Feed intake was higher ($P < .05$) for prairie hay and PH + FSS than for forage sorghum silage. Milo stover silage supported the slowest ($P < .05$) and least efficient ($P < .05$) gains.

The 12 and 14% protein rations from SBM supported the fastest and most efficient gains ($P < .05$) (Table 10.2). Calves fed the 10% protein ration from SBM gained faster and more efficiency ($P < .05$) than calves fed the 12% protein ration from urea. In general, performance of faster gaining calves (those fed forage sorghum silage, prairie hay or FSS + PH) tended to be improved more with additional SBM protein than that of calves gaining slower (those fed milo stover silage).

From these results feed costs and feed cost per lb. of gain can be calculated for each combination of forage and protein. When the price of SBM is high compared with that of urea and grain, the economic advantage of feeding 12 or 14% protein rations from SBM, of course, would be less than when SBM prices are low.

We used gains and feed efficiencies from the milo stover silage and forage sorghum silage rations to calculate predicted gain and efficiency for the 50% MSS + 50% FSS ration (Table 10.3). Observed gain exceeded predicted gain 0.08 lb. per day or 7.8%, and observed feed efficiency exceeded predicted efficiency 1.86 lbs. of feed per lb. of gain or 13.9%. The value of milo stover silage in growing rations for calves, therefore, is improved by feeding it with forage sorghum silage.

Table 10.1. Performances of heifers fed the five forages.

Item	Forage				
	FSS ¹	MSS ¹	PH ¹	MSS + FSS	PH + FSS
No. of calves	20	20	20	20	20
Initial wt., lbs.	429	427	429	429	429
Avg. daily gain, lbs.	1.25 ^a	.79 ^c	1.22 ^a	1.10 ^b	1.32 ^a
Avg. daily feed, lbs. ²	13.03 ^b	11.84 ^c	15.03 ^a	12.43 ^b	14.26 ^a
Feed/lb. of gain, lbs. ²	10.59 ^a	16.18 ^c	12.40 ^b	11.52 ^b	11.58 ^b

¹ FSS = forage sorghum silage; MSS = milo stover silage; PH = prairie hay.

² 100% dry matter basis.

^{a,b,c} Means in the same row with different superscripts differ significantly ($P < .05$).

Table 10.2. Performances of heifers fed the four protein treatments.

Item	Protein treatment: source and level			
	10%	SBM 12%	14%	Urea 12%
No. of calves	25	25	25	25
Initial wt., lbs.	429	428	427	429
Avg. daily gain, lbs.	1.10 ^b	1.22 ^a	1.28 ^a	.94 ^c
Avg. daily feed, lbs. ¹	13.39	13.55	13.45	12.90
Feed/lb. of gain, lbs. ¹	12.83 ^b	11.33 ^a	10.67 ^a	15.00 ^c

¹ 100% dry matter basis.

a,b,c Means in the same row with different superscripts differ significantly (P<.05).

Table 10.3. Observed and predicted rates and efficiencies of gain by heifers fed milo stover silage, milo stover silage + forage sorghum silage, or forage sorghum silage.

Item	Forage		
	MSS	FSS + MSS	FSS
No. of calves	20	20	20
Avg. daily gain, lbs.			
Observed	.79	1.10	1.25
Predicted	---	1.02	---
Improvement, lb. ¹		+.08	
Improvement, %		+7.8	
Feed/lb. of gain, lbs.			
Observed	16.18	11.52	10.59
Predicted	---	13.38	---
Improvement, lbs. ¹		-1.86	
Improvement, %		+13.9	

¹ Observed minus predicted.