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Sudangrass, sorghum-sudan, forage sorghum, and corn silages and three protein levels for growing yearling steers

Abstract

Sudangrass, sorghum-sudan, forage sorghum, and corn silages were full-fed to yearling steers for 70- or 91-day growing periods. For both periods, steers fed corn silage outperformed steers fed any other silage. In the 70-day period silages from both sudangrass and sorghum-sudan cut at 45- and 60-inch plant heights, respectively, supported performance similar to forage sorghum silage. For both periods steers fed sorghum-sudan (dough) silage gained slowest and least efficiently. For the 91-day period, rations containing 12.0% crude protein supported better performance than rations containing 10.5 or 9% protein and 10.5% protein rations supported better performance than 9% protein rations.

Keywords

Cattlemen's Day, 1978; Report of progress (Kansas State University. Agricultural Experiment Station); 320; Beef; Sudangrass; Sorghum-sudangrass; Forage sorghum; Corn silage; Protein; Steers

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Sudangrass, Sorghum-sudan, Forage Sorghum, and
Corn Silages and Three Protein Levels
for Growing Yearling Steers

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Summary

Sudangrass, sorghum-sudan, forage sorghum, and corn silages were full-fed to yearling steers for 70- or 91-day growing periods. For both periods, steers fed corn silage outperformed steers fed any other silage. In the 70-day period silages from both sudangrass and sorghum-sudan cut at 45- and 60-inch plant heights, respectively, supported performance similar to forage sorghum silage. For both periods steers fed sorghum-sudan (dough) silage gained slowest and least efficiently.

For the 91-day period, rations containing 12.0% crude protein supported better performance than rations containing 10.5 or 9% protein and 10.5% protein rations supported better performance than 9% protein rations.

Introduction

Sudangrass and sorghum-sudan are summer annuals commonly used for mid-to-late summer grazing in Kansas. They might be harvested for hay or silage but few data concerning their feeding value or effects of different maturity stages on cattle performance are available.

Information on adding or reducing protein in growing and finishing cattle rations is needed because protein prices fluctuate widely.

These trials evaluated various protein levels in growing cattle rations and compared sudangrass and sorghum-sudan silages with forage sorghum and corn silages for growing cattle.

Experimental Procedure

Five silages were harvested and ensiled in the summer of 1977.

<u>Silage and maturity</u>	<u>Harvest dates</u>
Corn (hard-dent)	August 4 and 5
Sudan (vegetative-45 inches)	July 18, August 9, September 9
Sorghum-sudan (vegetative-60 inches)	July 20, September 7
Sorghum-sudan (dough)	September 8
Forage sorghum (dough)	October 3

Corn, sorghum-sudan (dough), and forage sorghum were direct cut; sudangrass and sorghum-sudan were harvested in vegetative growth at approximately 45 and 60 inch heights, respectively, after they were field-wilted to 65 to 70% moisture. Cultivars were NK Trudan-6 hybrid sudangrass,

Dekalb 7+ sorghum-sudan, and Dekalb FS 25_a + forage sorghum. All forages were ensiled in concrete silos.

Seventy-five mixed breed yearling steers averaging 765 pounds were used in a trial beginning October 12, 1977, to compare silages and protein levels on steer performance.

Each silage was fed to three pens of five steers each in fixed percentage ration containing 84% silage, 12% milo-soybean meal, and 4% supplement^{1,2} (dry-matter basis).

One of three protein levels (9, 10.5, and 12%) was assigned to each of three pens by adjusting amounts of milo and soybean meal fed. Sudangrass and sorghum-sudan (60 inches) rations contained about 12% protein---crude protein content of these silages was too high to be used in the protein comparisons. Also, steers fed sudangrass and sorghum-sudan (60 inches) were weighed off test after 70 days when the supply of those silages ran out. The other three silages were fed 21 days longer (91 day trial ending January 11, 1978).

All steers were fed the same amount of prairie hay for 6 days before initial weighing and the same amount of experimental ration for 2 days before final weighing. All feed and water were withheld 16 hours before weights were taken.

Results

Dry matter, protein, and crude fiber contents of the five silages are shown in Table 17.1.

70-day Performance. Performances of the steers fed the 12% protein rations are shown in Table 17.2. Steers fed corn silage gained more (3.04 lbs. per day, $P < .05$), and were more efficient (7.02 lbs. of feed per lb. of gain, $P < .10$) than steers fed any of the other four silages. Sudangrass, sorghum-sudan (60 inches), and forage sorghum silages supported similar gains, but efficiency of gain was slightly better for forage sorghum silage. Steers fed sorghum-sudan (dough) silage gained slower ($P < .05$), tended to consume less feed, and were less efficient ($P < .05$) than steers fed any of the other four silages.

91-day Performance. Performances of the steers are shown in Table 17.3. Averaged across protein levels, steers fed corn silage gained faster ($P < .05$) consumed more feed ($P < .05$), and gained more efficiently ($P < .05$) than those fed sorghum-sudan (dough) or forage sorghum silages. As in the 70-day test, steers fed sorghum-sudan (dough) silage gained the least and were the least efficient.

¹Supplement fed with sudangrass, sorghum-sudan (60 inches), forage sorghum and corn silages, lbs./ton: milo, 1656; dicalcium phosphate, 160; salt, 125; fat, 30, trace minerals, 5; aurofac-10, 20; and vitamin A, 4.

²Supplement fed with sorghum-sudan (dough) silage, lbs./ton: soybean meal, 1686, dicalcium phosphate, 130; salt, 125; fat, 30; trace minerals, 5; aurofac-10, 20; vitamin A, 4.

Compared with corn silage, forage sorghum and sorghum-sudan (dough) silages supported 28 and 50% slower gains, respectively, and 27 and 73% less efficient gains, respectively. There was no interaction between silage and protein level.

Steers receiving 12% protein rations gained faster ($P < .10$) and tended to gain more efficiently than those receiving 10.5 or 9% protein rations. Steers fed 10.5% protein tended to gain faster and more efficiently, though not significantly so, than steers fed 9% protein. Feed intakes of rations of all three protein levels were similar.

Table 17.1. Analyses of the five silages (70 day period).

Silage	Dry matter, %	Crude protein	Crude fiber
		%, dry matter basis	
Corn	34.6	9.5	20.9
Sorghum-sudan (dough)	39.5	6.5	33.0
Forage sorghum	28.0	9.1	26.9
Sudangrass	30.0	14.8	28.9
Sorghum-sudan (60 inches)	32.3	12.5	28.9

Table 17.2. Effects of silages on 70-day steer performances.

Item	Silage				
	Sudan-grass	Sorghum-sudan (60 inches)	Corn	Sorghum-sudan (dough)	Forage sorghum
No. of steers	15	15	5	5	5
Initial wt., lbs.	768	759	757	771	759
Final wt., lbs.	936	930	1013	908	945
Avg. total gain, lbs.	168	171	256	137	186
Avg. daily gain, lbs.	2.41 ^b	2.43 ^b	3.04 ^a	1.71 ^c	2.41 ^b
Avg. daily feed, lbs.					
silage ¹	55.23	54.69	51.26	46.71	48.54
silage ²	19.33	19.14	17.94	16.35	16.99
milo ²	.88	.85	.65	0	.63
SBM ²	1.65	1.61	1.88	2.21	2.26
supplement ²	.94	.92	.86	.76	.83
total ²	22.80 ^d	22.52 ^{de}	21.33 ^{de}	19.32 ^f	20.71 ^{ef}
Feed/lb. gain, lbs.	9.46 ^e	9.27 ^e	7.02 ^d	11.30 ^f	8.59 ^e

¹35% dry matter basis.

²100% dry matter basis.

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

d,e,f,g Means in the same row with different subscripts differ significantly (P<.10).

Table 17.3. Effects of silages and protein levels on 91-day steer performance.

Item	Silage			Protein, %		
	Corn	Sorghum-sudan (dough)	Forage sorghum	9	10.5	12
No. of steers	15	15	15	15	15	15
Initial wt., lbs.	764	769	758	762	766	762
Final wt., lbs.	997	887	926	917	930	955
Avg. total gain, lbs.	233	118	168	155	164	193
Avg. daily gain, lbs.	2.57 ^a	1.29 ^c	1.85 ^b	1.71 ^e	1.88 ^e	2.12 ^d
Avg. daily feed, lbs.						
silage ¹	52.31	45.80	47.66	46.71	49.63	49.43
silage ²	18.31	16.03	16.68	16.35	17.37	17.30
milo ²	1.54	.82	1.43	2.03	1.32	.44
SBM ²	1.20	1.47	1.16	.49	1.18	2.15
supplement ²	.88	.77	.83	.79	.84	.84
total ²	21.93 ^a	19.11 ^b	20.09 ^b	19.66	20.72	20.72
Feed/lb. gain, lbs.	8.61 ^a	14.90 ^c	10.93 ^b	12.17	11.93	10.35

¹35% dry matter basis.

²100% dry matter basis.

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

^{d,e}Means in the same row with different subscripts differ significantly (P<.10).