

Kansas Agricultural Experiment Station Research Reports

Volume 0

Issue 1 *Cattleman's Day* (1993-2014)

Article 1214

1980

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Recommended Citation

Bolsen, K.; Ilg, H.; Axe, D.; and Thompson, W. (1980) "Summer annual silages and hay for growing steers," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 1. <https://doi.org/10.4148/2378-5977.2617>

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Summer annual silages and hay for growing steers

Abstract

Sudangrass, pearl millet, sorghum-sudangrass, and forage sorghum silages and sorghum-sudan hay were full-fed to yearling steers in a 90-day trial. Forage sorghum was harvested in the dough stage; the other four forages, in the late-vegetative stage. Steers consumed an average of 12.5% more hay than silage the first 42 days; hay feeding was discontinued then for lack of supply. At 90 days, steers fed forage sorghum silage outperformed those fed the other three silages. Compared with forage sorghum, the other silages had relative feeding values (based on rate and efficiency of gains) of 75% for sudangrass, 62% for pearl millet, and 68% for sorghum-sudan.

Keywords

Cattlemen's Day, 1980; Report of progress (Kansas State University. Agricultural Experiment Station); 377; Beef; Silage; Hay; Growing steers

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Summer Annual Silages and Hay for Growing Steers

Keith Bolsen, Harvey Ilg, Dirk Axe and Will Thompson

Summary

Sudangrass, pearl millet, sorghum-sudangrass, and forage sorghum silages and sorghum-sudan hay were full-fed to yearling steers in a 90-day trial. Forage sorghum was harvested in the dough stage; the other four forages, in the late-vegetative stage.

Steers consumed an average of 12.5% more hay than silage the first 42 days; hay feeding was discontinued then for lack of supply.

At 90 days, steers fed forage sorghum silage out-performed those fed the other three silages. Compared with forage sorghum, the other silages had relative feeding values (based on rate and efficiency of gains) of 75% for sudangrass, 62% for pearl millet, and 68% for sorghum-sudan.

Introduction

Summer annuals can produce high yields of high quality forage when harvested at an optimum stage of maturity. Our previous research indicates that hybrid sudangrass, hybrid sorghum-sudangrass, and pearl millet should be harvested in the vegetative to boot stages for highest quality forage and highest yield of digestible nutrients per acre (Progress Report 350, Kansas Agricultural Expt. Station).

In our first cattle trial, early-cut (vegetative) sudangrass and sorghum-sudangrass silages had 90 to 100% the feeding value of dough stage forage sorghum silage, but late-cut (dough stage) sorghum-sudangrass silage had only 70 to 75% the value of forage sorghum silage (Progress Report 320, Kansas Agricultural Expt. Station).

In this experiment, we compared three early-cut summer annual silages and one early-cut summer annual hay with forage sorghum silage in growing cattle rations.

Experimental Procedure

Five forages harvested in the summer and fall, 1978, were compared: 1) sudangrass, 2) pearl millet, 3) forage sorghum, and 4) sorghum-sudan silages and 5) sorghum-sudan hay. First, 2nd, and 3rd cuts of sudangrass and pearl millet and 1st and 2nd cuts of sorghum-sudan were mowed and swathed at late-vegetative growth then field-wilted to 30 to 35% dry matter (DM) before ensiling. Forage sorghum was direct-cut in the dough stage for ensiling. Hay from 2nd cut, late-vegetative sorghum-sudan was made in rectangular

bales (70 to 80 pounds each). All silages were made in 10-ft x 50-ft concrete-stave silos.

Varieties and hybrids were Northrup King Trudan-6 hybrid sudangrass, Northrup King 'Millex 23' hybrid pearl millet, Dekalb FS 25a+ hybrid forage sorghum, and Dekalb 7+ hybrid sorghum-sudan.

Seventy-five yearling steers averaging 738 pounds were allotted to 15 pens with three pens assigned to each of the five forages. The fixed-percentage rations contained 84% silage or hay, 12% rolled milo, and 4% supplement¹ on a DM basis; rations were mixed and fed to appetite twice daily. Soybean meal replaced milo in the forage sorghum silage ration. Because the late-vegetative forages ranged from 12.7 to 15.9% crude protein, the protein contents of these four rations varied from 12.2 to 14.9% during the trial. The forage sorghum silage ration averaged 12.5% protein. Hay was chopped with a tub grinder with 2-inch recutter screen before being fed.

All steers had grazed native bluestem pasture during the summer of 1978, and all were full-fed grass hay plus 2 pounds of grain in dry lot for 4 weeks before the feeding trial. Initial, 42-day intermediate, and 90-day final weights were taken after all steers were without feed or water 16 hours.

Results

Dry matter and crude protein contents of the five forages are shown in Table 13.1.

Performances of steers after 42 days are shown in the top half of Table 13.2. When supply of sorghum-sudan hay ran out, steers fed hay had consumed 16% more forage than steers fed the companion (sorghum-sudan) silage and 5 to 17% more forage than steers fed the other three silages. Steers receiving forage sorghum silage made the fastest and most efficient gains at 42 days; those receiving pearl millet silage, the slowest and least efficient.

Performances of steers after 90 days are shown in the bottom half of Table 13.2. Severe winter weather with extremely cold temperatures and heavy snows were responsible for very poor rates and efficiencies of gain the final 48 days; the 60 steers averaged only .43 pounds gain per day.

Overall performance for the 90 days showed steers fed forage sorghum silage gained significantly faster ($P < .05$) and more efficiently ($P < .05$) than steers fed the other three silages. Although differences were small, sudangrass silage gave better performance than either pearl millet or sorghum-sudan silages. During the first 42 days, intakes of sudangrass and pearl millet silages were 1.0 to 1.9 pounds higher than intake of forage sorghum silage. At the end of the 90-day trial, those differences were only .2 to .3 pound per day.

¹Supplement ingredients (lbs/ton): rolled milo, 1655; dicalcium phosphate, 160; salt, 125; fat, 30; trace minerals, 5; aurofac -10, 20; and vitamin A premix, 5.

Table 13.1. Analyses of the five forages.

| Forage | Dry matter % | Crude protein %, DM basis |
|-----------------------|-----------------|------------------------------|
| Sudangrass silage | 36.0 | 13.4 |
| Pearl millet silage | 28.6 | 14.8 |
| Sorghum-sudan silage | 26.0 | 14.4 |
| Sorghum-sudan hay | 88.6 | 12.9 |
| Forage sorghum silage | 29.0 | 6.3 |

Table 13.2. Performances by steers fed the indicated five forage rations.

| Item | Through 42 days (Nov. 9 to Dec. 21, 1978) | | | | |
|---|---|-----------------|-------------------|-------------------|------------------|
| | Silage | | | | Hay |
| | Sudan- grass | Pearl millet | Forage sorghum | Sorghum- sudan | Sorghum sudan |
| Initial wt., lbs. | 743 | 741 | 734 | 735 | 740 |
| 42-day wt., lbs. | 813 | 807 | 836 | 807 | 814 |
| Avg. daily gain, lbs. | 1.67 | 1.57 | 2.43 | 1.71 | 1.76 |
| Avg. daily feed, lbs. ¹ | | | | | |
| silage or hay | 17.5 | 18.4 | 16.5 | 16.4 | 19.3 |
| SBM or milo | 2.8 | 2.6 | 2.5 | 2.9 | 2.8 |
| supplement | .9 | .9 | .9 | .9 | 1.0 |
| total | 21.3 | 21.9 | 19.9 | 20.2 | 23.1 |
| Feed/lb. of gain, lbs. ¹ | 12.8 | 13.8 | 8.2 | 11.8 | 13.2 |
| | Through 90 days (Nov. 9, 1978, to Feb. 7, 1979) | | | | |
| 90-day wt., lbs. | 841 | 821 | 864 | 820 | |
| Avg. daily gain, lbs. | 1.09 | .89 | 1.44 | .94 | |
| Avg. daily feed, lbs. ¹ | | | | | |
| silage | 17.1 | 17.2 | 16.9 | 16.5 | |
| SBM or milo | 2.7 | 2.6 | 2.6 | 2.6 | |
| supplement | .9 | .9 | .9 | .9 | |
| total | 20.7 | 20.7 | 20.4 | 20.0 | |
| Feed/lb. of gain, lbs. | 19.0 | 23.4 | 14.2 | 21.3 | |
| Avg. daily gain from 42 to 90 days, lbs. | .58 | .29 | .58 | .27 | |

¹100% DM basis.