Use of Silage in Wheat Pasture and Bermudagrass Stocker Programs

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Story in Brief

Ninety-six fall-weaned steer calves were placed on wheat pasture and subsequently bermudagrass pasture at different stocking rates. Steers had access to only pasture (treatment 1) or had ad libitum access to sorghum silage on pasture (treatments 2, 3 and 4). Stocking rates (acres/steer) for steers in treatments 2, 3 and 4 were 100 percent, 75 and 50 percent of that for steers in treatment 1. Silage was fed daily to the steers on wheat pasture, but to steers on bermudagrass pasture only during periods of inadequate forage availability. Because of large amounts of available wheat forage, consistent differences among treatments in silage consumption of steers were not observed. Average daily gains of steers in the 4 treatments on wheat pasture ranged from 2.10 to 2.58 lb. On bermudagrass, silage had to be fed to steers in treatments 3 and 4 for 14 and 28 days, respectively. Consumption of silage by steers in treatment 4 increased rapidly from about 3 lb DM/ head/ day to 11 lb DM/head/day from July 18 to August 14. Average daily gains of steers on bermudagrass ranged from 1.22 to 1.51 lb and were not different (P>.10) among treatments. Use of silage in bermudagrass stocker programs will allow stocking rates to be increased and gains to be maintained during periods of inadequate forage availability.

Introduction

A project was begun during the fall of 1981 to study effects of feeding silage to stocker cattle on wheat pasture and subsequently bermudagrass. Primary objectives were (1) to add stability to the forage supply and (2) to determine effects of increasing levels of supplemental silage on forage (wheat and bermudagrass) intake and rate of passage. Results, relative to objective 1, of the first year of the study were reported by Ford et al. (1983). Results of the second year (1982-83) of the project are reported herein.

Materials and Methods

Wheat Pasture. Because of a very dry late summer and early fall in 1982, the total acreage of wheat pasture available to the project for the 1982-83 grazing season was greatly reduced and the amounts of available forage per unit area were highly variable. Stocking rates

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(acres/steer) on wheat pasture had to be varied from the desired stocking rates of 2.5, 2.5, 1.88 and 1.25 acres/steers to 3.1, 2.5, 2.3 and 2.3 for treatments 1 through 4, respectively. However, due to the variability of forage density the amount of forage available was different. At the initiation of wheat pasture grazing period available forage was 1199 lb (100), 1681 lb (140), 1085 lb (90) and 634 (53) lb dry matter (percentage of treatment 1) for each steer in treatments 1 through 4.

Ninety-six fall weaned Hereford, Angus and Hereford x Angus steer calves (averaging 447 lb) were allotted to two blocks of 48 steers each and randomly assigned to each of the four treatments within each block. Due to a lack of forage, only one block was used during the wheat pasture phase, but both blocks were used during the subsequent bermudagrass phase. Steers in treatments 2, 3 and 4 had ad libitum access to sorghum silage, which was fed daily during the 62-day grazing period (January 14 to March 17) on wheat pasture. The sorghum silage was a grain type and had mean dry matter (DM), crude protein contents and an in vitro dry matter digestibility of 27.7, 8.64 and 53.1 percent, respectively. Animals from all four treatments within a block were composited for the graze-out phase (March 17 to May 26) and allowed 0.6 acres per steer. No supplemental silage was offered during this phase.

Old world bluestem hay was fed to the steers of treatment 1 on 9 days (3.5 lb/head/day) because of snow and/or ice cover of wheat forage. Available forage of each pasture was estimated by hand-clipping 5 randomly selected one-half square meter plots at selected times during the grazing period on wheat pasture and bermudagrass.

Bermudagrass. The same steers that were used during the wheat pasture phase of the project were used on bermudagrass (May 26 to September 27) which followed the graze-out period on wheat pasture. The stocking rates in terms of acres of bermudagrass per steer and pounds of steer per acre were .75 and 1013, .75 and 1017, .56 and 1341, and .38 and 1975 for treatments 1 through 4. Acreage allotment for treatments 2, 3 and 4 were 100, 75 and 50 percent of that for treatment 1.

Each treatment group occupied one pasture which was divided into two equal paddocks. A rotational grazing system between the two paddocks was used in the grazing management of each bermudagrass pasture. The objective of the grazing management was to keep the bermudagrass in a paddock between 1 to 4 inches tall. Excess forage in a paddock was mowed and/or baled for hay prior to grazing. During late July to early August when the rate of forage regrowth was slow, it was necessary to give steers access to the total pastures (both paddocks) in order to provide enough forage. In treatments 3 and 4, the total pasture could not provide enough forage, so sorghum silage was provided ad libitum.

All pastures were fertilized with 50 lb of nitrogen (as ammonium nitrate) per acre per application on May 12 and July 14. All of the pastures were mowed in early June, following the initial grazing, to remove mature cool season annual grasses.

Results and Discussion

Wheat Pasture. Silage consumption of steers of treatments 2, 3 and 4 were small and no differences among treatments were observed. This was attributed to the large amount of wheat forage available to all steers throughout the experiment. Climatic conditions were favorable for wheat forage growth and the desired grazing pressures, could not be achieved. The relationship between silage DM intake and forage DM availability is shown in Figure 1. Each time period is one week in length and begins on January 13, 1983. Forage DM availability is the mean of all four treatments and silage DM intake is the mean of treatments 2, 3 and 4. As forage DM availability increased, silage DM consumption decreased. Silage DM consumption ranged between 1 and 4 lb per head per day. Forage availability was the lowest for treatment 4 but never decreased below 630 lb of DM per head. For perspective, wheat forage that is 6 in. tall planted on 12 in. row spacings will yield about 500 lb forage DM/acre.

Average daily gains (ADG) of the steers (Table 1) were higher than previously observed during the first year of this experiment, and were similar among the 4 treatments, which was a reflection of the abundant available forage. Average daily gains during the graze out phase were higher than during the first portion of the grazing season as anticipated and were similar among treatments. Because only one block of steers were used, statistical analysis could only be done on ADG.

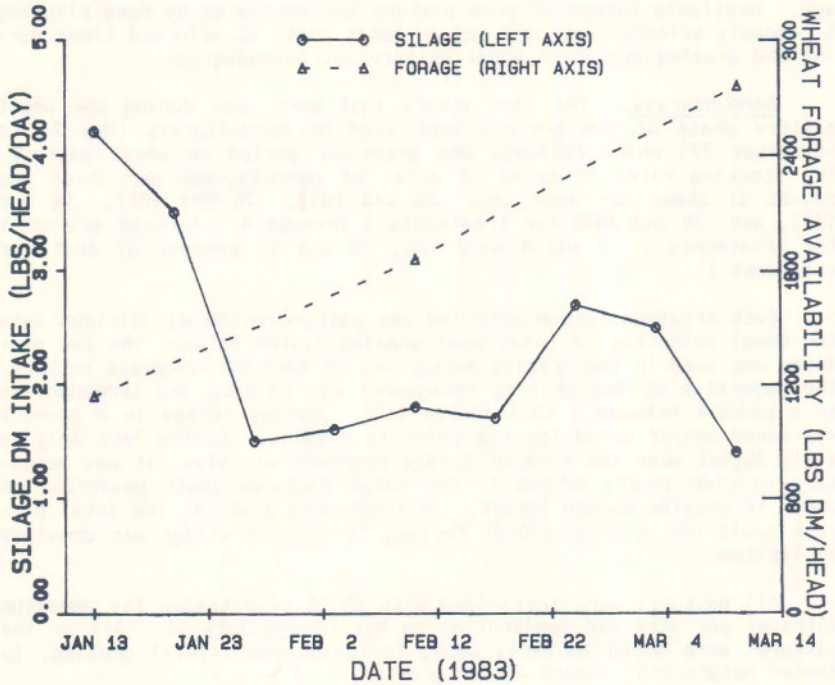

Figure 1. Silage dry matter (DM) intake and forage DM availability averaged across all treatments during wheat pasture phase.

Table 1. Body weights and daily gains of steers.

	Treatment			
	1	2	3	4
Silage:	-	+	+	+
Grazing phase				
Wheat pasture				
Number of steers	12	12	12	12
Number of steers per acre	.32	.40	.48	.43
Initial wt, lb	451	451	445	448
Daily gain[a], lb				
1/14-3/17/83, 62 days	2.10	2.58	2.30	2.22
3/17-5/26/83, 70 days	2.85	2.78	2.82	2.76
(Graze-out period)[b]				
Bermudagrass				
Number of steers	24	24	24	24
Number of steers per acre	1.33	1.33	1.78	2.67
Initial wt, lb	760	763	751	740
Final wt, lb	948	914	922	902
Daily gain, lb				
5/26-9/27/83, 124 days	1.51[c]	1.22[c]	1.38[c]	1.30[c]

[a]Statistical analysis could not be conducted
[b]Silage was not fed during graze-out period
[c]Means not different (P>.10)

Bermudagrass. Supplemental forage in the form of silage was provided only when both paddocks within a pasture were available to the steers and forage availability was still lower than animal needs. As soon as the forage growth would support the rotational system, feeding of supplemental silage was discontinued. Forage availability became limiting first in the heaviest stocking rate group (treatment 4). Thus, it was necessary to begin feeding silage to this group on June 30 (Fig. 2). Daily consumption of silage increased rapidly from about 3 lb to 11 lb per head per day from July 18 to August 24. Steers in treatment 3 (medium grazing pressure) were fed silage for only 14 days (August 8 to 21) in which they consumed 8.5 lb of silage DM per head per day. Silage was never fed to the steers in treatment 2, because forage availability never became limiting.

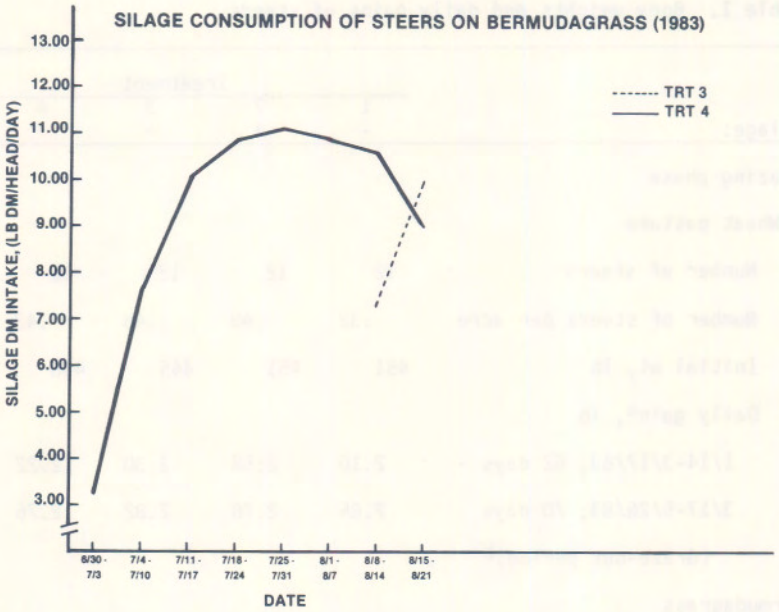

Figure 2. Silage consumption of steers on bermudagrass (1983).

The results of this year of data indicates that when wheat forage DM availability does not fall below 630 lb per head, then forage is not limiting and supplemental silage feeding will not increase ADG. During the bermudagrass phase of this experiment, forage availability did become limiting as initial stocking rate was increased from 1013 to 1975 pounds of steer per acre, but by feeding silage during this period, the ADG of the steers was not reduced. As a result, the amount of beef produced per acre under the heavy stock rate was almost doubled that of the control group, but the amount of inputs required were increased by the need for supplement feeding, storage and feeding facilities. A complete economic analysis of this data will be done after 3 years of animal data have been collected.

Literature Cited

Ford, M.J. et al. 1983. Anim. Sci. Res. Rep. MP-114:226.