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Preliminary Comparisons of Molasses Tubs, Grain, or Clover Pasture for Supplementing Beef Heifers Fed Bermudagrass Hay Free Choice

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INTRODUCTION

Grazing quality summer or winter pastures is the most desirable method of obtaining satisfactory/economic gains in growing beef cattle. However, at times in the fall and winter, pasture may not be available. Instead, animals must be fed stored feeds — in the South, bermudagrass or bahiagrass hay. Such hay is usually low in quality and fails to meet the nutritional needs of growing cattle. Thus, cattle usually do not perform satisfactorily on hay alone. In recent years, molasses blocks fed in tubs, which offer labor savings, have increased in popularity as a supplemental feed source for forage-based diets. More companies are entering this sector of the feed supplement market, offering and promoting their products. The purpose of this research report is to (1) determine if differences in supplement intake and animal performance exist when supplementing with two types of commercially available molasses block tubs, and (2) compare animal performance using tubs as the supplement source with performance using grain as the supplement source. A negative control, hay alone, was planned, but the pasture for this treatment had an unanticipated stand of clover that resulted in a clover comparison instead. A ryegrass pasture was not included for comparison because these treatments were designed for use when ryegrass is not available.

EXPERIMENTAL PROCEDURE

In this preliminary study, 32 yearling beef heifers were blocked by weight and assigned to four treatment groups: TUB1, TUB2, GRAIN, and CLOVER. The TUB1 group received the Natural Forage Extender 20® (Forage Star Feeds, Miles, Texas) molasses block tub, which contains 20% all-natural protein and 6% fat. The TUB2 group received the Rangeland 30-13® (Land O'Lakes Farmland Feed LLC, Fort Dodge, Iowa) molasses block tub, which contains 30% protein (13% urea, 17% natural protein) and 4% fat. Both brands were fed free choice in 225-pound plastic tubs. The GRAIN group received 7.4 pounds per head daily of a custom ration (16.2% protein) consisting of 14% soybean meal, 52% soybean hulls, and 35% ground shelled corn. The CLOVER group was intended to be the negative control group fed hay alone, but the dormant bahiagrass pasture for this group had enough clover in December and January to affect the results. Pastures for the other three groups were dormant bahiagrass pasture without clover.

All dormant pastures were clipped or grazed to the same height at the beginning of the study to insure that hay intake would not be affected by stubble. Bermudagrass hay (7-10% protein) was fed in large round bales placed in hay rings. The amounts of hay, molasses, and grain fed were recorded. Hay bales were estimated to weigh 1,000 pounds each based on previous studies (St. Louis and McCormick, 2002). Animals were weighed monthly and at the conclusion of the study. The 120-day study began November 27, 2001, and ended March 27, 2002, when emerging bahiagrass pasture began to affect hay intake.

Animal performance data were analyzed using the ANOVA procedure of SAS (SAS Inst., Inc., Cary, North Carolina) in a one-way analysis of variance. The Ryan-Einot-Gabriel-Welsh Multiple Range Test was used for mean separation because it is a conservative test that appropriately protects from declaring significance when none exists (Type 2 error).

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Results and Discussion

Cattle gains were not significantly affected by brand of molasses tub (P<0.05). However, the quantity consumed differed considerably. TUB1 heifers consumed more of the Natural Forage Extender 20 tub than the TUB2 heifers did of the Rangeland 30-13 tub (167 pounds compared with 95 pounds per head, respectively). This difference may have been due to palatability as there was no apparent difference in hardness. Protein ingredients in TUB2 contained urea, while TUB1 contained all-natural protein. The heifers fed grain performed better than the other groups (P>0.05) (1.95 pounds ADG compared with 1.01, 1.19, and 1.19 pounds ADG for TUB1, TUB2, and CLOVER, respectively). The lack of difference in performance between TUB1 and TUB2, considering the differences in intake, seems to indicate that nutritional requirements for protein were being met in both groups, and the additional energy consumption in the TUB1 group was not enough to significantly affect gains. The CLOVER group of heifers received only hay, and this pasture was designed to be a negative control. However, clover in the pasture was overlooked, and as a result, gains were similar to those supplemented with molasses blocks (Table 1) and greater than would be expected when feeding hay only (Figure 1).

Total feed costs were $98.50, $73.06, $75.01, and $40.62 per head for heifers in the TUB1, TUB2, GRAIN, and CLOVER groups, respectively. Feed costs per hundred pounds of gain were $81.40, $51.09, $31.92, and $28.41, respectively. Admittedly, the GRAIN group required more labor because the heifers were hand-fed daily. To estimate labor costs, it was assumed that it took 15 minutes of labor each time a hay bale, molasses tub, or grain was fed. A labor charge of $6 per hour was assumed. The combined feed **and** labor costs per hundred pounds of gain were

Table 1. Animal performance, feed intake, and costs of heifers wintered on molasses tubs, grain, or pasture while receiving bermudagrass hay free choice.

Variable	Unit	TUB1	TUB2	GRAIN	CLOVER
Animals	head	8	8	8	8
Beginning weight	lb	636	658	638	642
Ending weight	lb	757[1]	801[1]	873[2]	785[1]
Gain	lb	121[1]	143[1]	234[2]	143[1]
ADG[3]	lb	1.01[1]	1.19[1]	1.95[2]	1.19[1]
Hay fed[4]	lb/hd/day	15.63	15.63	8.33	13.54
Molasses fed[5]	lb/hd/day	1.39	0.79		
Grain fed[6]	lb/hd/day			7.40	
Total feed	lb/hd/day	17.02	16.42	15.73	13.54
Hay cost[4]	$/head	46.88	46.88	25.00	40.62
Molasses tub cost[5]	$/head	51.62	26.18		
Grain cost[6]	$/head			50.01	
Total feed cost	$/head	98.50	73.06	75.01	40.62
Labor for feeding[7]	$/head	3.93	3.45	24.00	2.44
Clover cost[8]	$/head				20.58
Cost of gain[9]					
Feed only	$/cwt	81.40	51.09	31.92	28.41
Feed and labor	$/cwt	84.65	53.50	42.13	30.11
Feed, labor, and clover	$/cwt	84.65	53.50	42.13	44.50

[1,2]Means in the same row with different superscripts are different (P<0.05).
[3]Average daily gain (ADG) for 120 days.
[4]Large round bales of bermudagrass hay fed in hay rings, about 1,000 pounds per bale, $25 per bale.
[5]Molasses block tubs, 225 pounds each, $69.50 and $62 per tub for TUB1 [Natural Forage Extender 20 (Forage Star Feeds, Miles, Texas)] and TUB2 [Rangeland 30-13 (Land O'Lakes Farmland Feed LLC, Fort Dodge, Iowa)], respectively.
[6]Grain mixture (16.2% protein) hand fed daily, $112.64 per ton.
[7]Labor for feeding 120 days assuming 15 minutes each time hay, grain, or tubs were fed, $6 per hour.
[8]Clover pasture assuming $41.12 per acre (Table 2) every 2 years and stocked at 1 head per acre.
[9]Cost of gain = cost per head/cwt of gain.

Table 2. Estimated costs per acre for planting white clover pasture.[1]

Operation/	Size/	Direct Cost						Fixed	Total
Operating Input	Unit	Op Input	Fuel	R&M[2]	Labor[3]	Interest[4]	Total	Cost[5]	Cost
Soil Testing	acre	0.60				0.04	0.64		0.64
Lime (Spread)	0.33 ton[6]	9.57				0.68	10.25		10.25
Rotary Mower	8'		0.83	0.98	2.04	0.24	4.09	2.12	6.21
No-till Grain Drill	12'		0.69	3.67	3.07	0.47	7.90	7.96	15.86
White Clover Seed	3 lb		7.68				0.48	8.16	
Totals		17.85	1.52	4.65	5.11	1.91	31.04	10.08	41.12

[1]Budget from Mississippi State Budget Generator v5.5, Department of Agricultural Economics, Mississippi State University.
[2]R&M = repair and maintenance.
[3]Labor for tractor driver, $8.76 per hour. Hand labor required for 1 hour per acre for drill, $6.91 per hour.
[4]Interest at 9.53% for 8 months.
[5]Fixed costs (depreciation) assume $22,950 and $4,900 initial costs for no-till drill and rotary mower, respectively. Salvage values 15% for both implements after 10 years of use at 100 hours per year and 12 years of use at 150 hours per year, respectively.
[6]Lime spread at 1 ton per acre every 3 years.

$84.65, $53.50, $42.13, and $30.11 for the TUB1, TUB2, GRAIN, and CLOVER groups, respectively (Table 1).

A variety of factors make it difficult to assess the cost and value of clover pasture, especially considering these data are from just 1 year of study. Weather, which is a key determinant of clover productivity and availability in dormant bahiagrass pasture from mid-November to mid-March, is obviously unpredictable. Normally, clover grazing is not expected at this time of year. The CLOVER group of heifers performed well (1.83 pounds ADG) in the December to January period (Figure 1). However, their ADG ranged from 0.88 to 1.06 pounds ADG in other periods, considerably less than other groups. White clover is customarily replanted every 2 to 3 years to maintain a stand (Ball et al., 1991). When environmental conditions are ideal, dormant native white clover seeds will germinate and provide stands as apparently happened in this study. In this study, white clover emerged in an 8-acre summer perennial pasture (one head per acre stocking rate). A limited cost analysis of white clover pasture is needed to help determine expected productivity and economic performance over time. This appears to have been an atypical year, especially favorable to clover growth. Nevertheless, for this preliminary economic analysis, based on these limited data, it was assumed that clover would be planted every 2 years at a cost of $41.12 per acre (Table 2) and stocked at one head per acre. With these additional assumptions, the combined feed, labor, **and** clover cost per hundred pounds of gain was $84.65, $53.50, $42.13, and $44.50 for TUB1, TUB2, GRAIN, and CLOVER groups, respectively (Table 1).

Hay consumption was not affected by brand of molasses tub. However, hay intake was less when grain or clover was offered (Table 1). This is contrary to the findings of St. Louis et al. (2002), which showed hay intake of mature nonlactating cows was not reduced by supplementing with corn or soybean hulls.

The reader is urged to use caution when making production decisions based on this limited 1-year study. The grain ration, in terms of quantity and quality, for the heifers in the GRAIN group was formulated to produce expected gains of 1.5 pounds per day based on average hay analysis. These heifers actually performed better than expected (1.95 pounds ADG). The cost of clover use is, at this point, indeterminate because clover production is highly variable at this location. Farmers who custom graze stocker cattle on ryegrass pasture in south Mississippi are paid about $30 to $35 per pound of gain, which is less than the costs of gain in this study. Still, these data are useful for farmers seeking a source of cheap gain when ryegrass pastures are not available.

Cost of gain may not be the only consideration in many management situations. For example, replacement heifers often must meet a target weight by a target date for breeding. Some additional cost of gain may be justified if it boosts the probability of success in getting them bred on time.

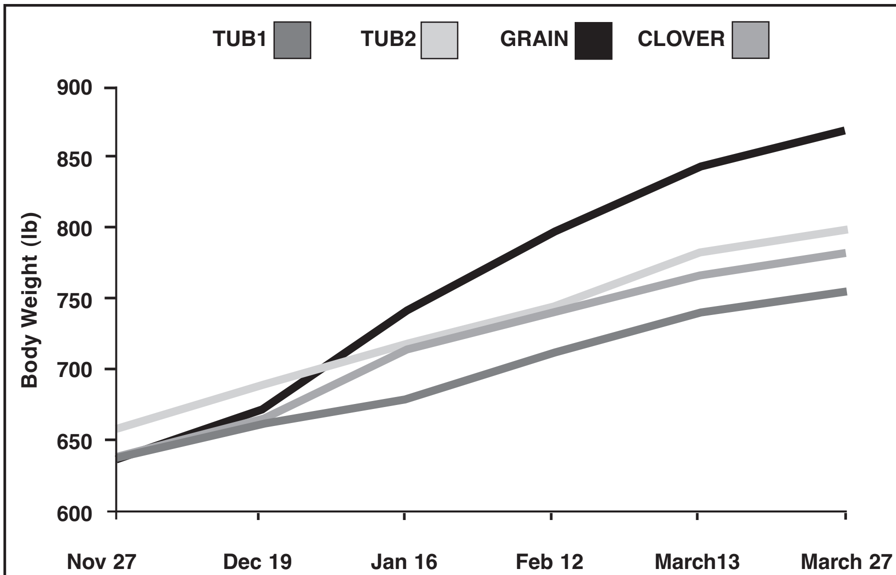

Figure 1. Change in body weight of heifers during the trial period. Treatments: TUB1 = Natural Forage Extender 20 molasses block tub (20% protein), TUB2 = Rangeland 30-13 molasses block tub (30% protein), GRAIN = 7.4 pounds per head daily of a custom ration (16.2% protein), and CLOVER = dormant bahiagrass pasture without clover. Bermudagrass hay (7-10% protein) was fed ad libitum.

Summary

Cattle gains were not affected by the brand of molasses block tub, but block consumption differed significantly between blocks, affecting the cost of gain. Supplementing with grain improved gains over those of supplementing with molasses blocks. The cost of gain was also lower when feeding grain, even though the total cost of feed was more than that of the molasses tubs. Cost of gain from clover pasture is highly variable but may be an attractive alternative that warrants further investigation.

References

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