EFFECTS OF BERMUDAGRASS-CLIPPINGS PELLETS ON GROWTH AND CARCASS CHARACTERISTICS OF LAMB

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ABSTRACT

Sixty Suffolk, Suffolk x Rambouillet, and St. Croix x Dorper (hair sheep) lambs were randomly assigned within breed group to 10 pens to determine if bermudagrass-clippings (*Cynodon dactylon* L.) from lawns could be an alternative forage source in feedlot diets. Each pen, an experimental unit, consisted of Suffolk (n=2), Suffolk x Rambouillet (n=2), and hair crossbred (n=2) lambs. Treatment and control diets were randomly assigned to pens with five replications. Treatment diets contained bermudagrass-clipping pellets with control diets containing alfalfa (*Medicago sativa* L.) pellets, each fed at 10% of the total ration. Lambs were weighed on day 0 and weekly, thereafter, and fed ad libitum to end weights of 54 kg for wethers and 49 kg for ewe lambs at which time they were slaughtered. No differences were observed between treatments for feed efficiency or carcass characteristics, although breed effects existed. While breed did not effect total gain (P > .05), effects were determined (P < .05) for days on feed, average daily gain, consumption, average daily feed intake (ADFI), and feed:gain. No treatment*breed interaction (P > .05) existed for feed efficiency or carcass characteristics. Therefore, bermudagrass-clippings can be an alternative forage source for feedlot lambs when fed at 10% of a finishing diet.
KEY WORDS: Lambs, Bermudagrass, Growth

INTRODUCTION

Bermudagrass is commonly grown in many domestic lawns across the United States. Mowing of these lawns produces millions of tons of lawn wastage annually. The Environmental Protection Agency has stated that grass-clippings and lawn wastage account for approximately 18% of the refuse that has historically been dumped into landfills (EPA, 1998). Other means of disposal of grass-clippings have included mulching and composting but this has made little reduction in the overall wastage.

Alfalfa is a common forage fed to ruminant livestock for production. Alfalfa supplies necessary protein and energy for animals to grow and maintain life. Bermudagrass is not very similar to alfalfa in general. However, bermudagrass from domestic lawns exhibits many of the same nutritive qualities as alfalfa (Table 1). Therefore, research was conducted to determine if bermudagrass collected from domestic lawns could be used as an alternative forage source in livestock diets. The research had two objectives. The first objective of this study was to determine the affects of feeding bermudagrass-clipping pellets on days on feed, average daily gain, ADFI, feed:gain, hot carcass weight, dressing percent, back fat thickness, leg score, flank streaking, and quality grade of lambs. The second objective was to compare breed types of lambs to determine if feed efficiency or carcass characteristics were affected by feeding bermudagrass-clipping pellets.

Table 1. Chemical Composition of Bermudagrass-Clipping Pellets and Alfalfa Pellets

	Bermudagrass	Alfalfa
DM, %	89.25	92.81
Ash, %[a]	15.35	12.3
CP, % [a]	24.23	18.81
Ca, % [a]	1.12	1.19
P, % [a]	0.3	0.22
NDF, % [a]	58.51	45.52
Nitrates, %[a]	0.18	--

[a]DM Basis

MATERIALS AND METHODS

Animals, Diets, and Management: Sixty medium wool and hair breed lambs (average initial BW=36.73 kg) were used to study the effects of bermudagrass-clipping pellets on growth efficiency and carcass characteristics. On day 0, lambs were weighed and within breed sex combination were randomly allotted to pens within treatment. Each pen consisted of one Suffolk wether, one Suffolk ewe lamb, one Suffolk x Rambouillet wether, one Suffolk x Rambouillet ewe lamb, one hair breed wether, and one hair breed ewe lamb. The experimental unit was considered the pen. All animals had free access to water. Two treatments consisting of either 10% alfalfa pellets or 10% bermudagrass-clipping pellets (Tables 2) were randomly assigned to the 10 research pens. Table 3 lists the chemical compositions of the treatment and control diets.

Alfalfa pellets used in the experiment were analyzed to determine percent DM, ash, CP, Ca, P, and NDF. Bermudagrass-clippings used in the study were collected from a local landscape company immediately after clipping. The lengths of the grass-clippings were approximately 0.635 cm to 1.27 cm in length. After collection, clippings were weighed and dried for 48 h. After drying, grass-clippings were then weighed to determine percent shrink. Clippings were then pelleted through a 0.953 cm dye and bagged.

Table 2. Ingredient Composition of Diets (% of diet, DM basis)

Ingredient	Treatment	Control
Cracked Corn	64.87	63.26
Cottonseed Meal 41% CP	5.75	5.75
Soybean Meal 44% CP	2.05	3.76
Cottonseed Hulls	10.50	10.50
Pelleted Bermudagrass-Clippings	10.00	0.00
Alfalfa Pellets	0.00	10.00
Calcium Carbonate	1.30	1.20
Ammonium Chloride	0.50	0.50
Cane Molasses	5.00	5.00
Premix[a]	0.03	0.03

[a]Premix included Vitamin A, Selenium, and Decox at levels recommended by NRC (1985)

Table 3. Chemical Composition of Treatment and Control Diets

	Treatment Diet	Control Diet
DM, %	86.81	87.26
Ash, %[a]	8.71	7.53
CP, %[a]	13.65	13.82
Ca, %[a]	1.12	1.03
P, %[a]	0.33	0.39

[a] DM Basis

Laboratory analysis was also performed on the bermudagrass clippings to determine percent DM, ash, CP, Ca, P, NDF, and Nitrates.

Feed bunks were visually evaluated between 1600 and 1700 daily for estimation of the daily feed allotment. The quantity of unconsumed feed remaining in each bunk was estimated, and the quantity of feed delivered was adjusted to ensure ad libitum feed intake. Feed samples of each treatment were obtained for DM determination. After completion of the 98-d study, feed samples were sorted by treatment and a composite of each treatment was made. These composites were then analyzed for contents of DM, CP, ash, Ca, and P (AOAC, 1990).

Lambs were weighed every seven days during the trial. At the conclusion of the trial, feed bunks were swept and any remaining feed was removed from the bunk, weighed, and sampled for DM content. The DM content of the feed weigh-back was determined in the same manner as weekly feed samples, and the quantity of dry feed removed from the bunk was subtracted from the total of the dry feed delivered to obtain an accurate measurement of ADFI and consequently feed efficiency.

As lambs reached their target weight, they were removed from the study. Target weight for wethers was set at 54 kg and 49 kg for ewe lambs. Carcass data was collected from the wethers. Ewe lambs were used as replacement ewes for the Texas Tech University sheep flock. When target weights were met, lambs were slaughtered. Animals were slaughtered at four different time periods. Carcass characteristics including hot carcass weight, dressing percent, back fat thickness, leg score, flank streaking, and quality grade were collected. Fat thickness was measured at the 12th rib and flank streakings were scored and used as a measure of quality. The scale from least to most streaking was: devoid, practically devoid, slight, modest, moderate, slightly abundant, and abundant. Leg scores were used to assign a muscle score to a carcass. The scale from least to the most muscling was: devoid, slight, modest, moderate, slightly abundant, and abundant. Yield grade is based on the fat thickness at the 12th rib, and quality grade is based on the leg and flank streaking score.

Statistical Analysis: Initial weight, days on feed, ADG, Total DMI, ADFI, and feed:gain ratio was analyzed as a completely randomized split plot design in the Mixed procedure of SAS (1999). Within breed sex combination, lambs were randomly allotted to pens within treatment. Treatment effect was analyzed in the main plot and breed and treatment*breed interaction was analyzed in the sub-plot. Pen was considered the experimental unit for all feed efficiency data.

Hot carcass weight, dressing percent, back-fat thickness, leg score, conformation, flank streaking, and quality grade were also analyzed as a completely randomized split plot design in the Mixed procedure of SAS (1999). Just as with the feed efficiency data, lambs were randomly allotted to pens within treatment within breed sex combination. Carcass data was only collected on the wethers because ewe lambs were returned to the flock as replacement ewes. Treatment effect was analyzed in the main plot and breed and treatment*breed interaction was analyzed in the sub-plot just as in the feed efficiency data. Animal was considered the experimental unit for all carcass data.

RESULTS AND DISCUSSION

Initial weight, days on feed, average daily gain, ADFI, and feed:gain ratio were not significantly different ($P > .05$) between the treatment group and the control group. However, initial weight was different ($P < .02$) between Suffolk and hair sheep as well as Rambouillet x Suffolk and hair sheep ($P < .05$). Hair sheep were significantly higher ($P < .001$) than Suffolk and Rambouillet x Suffolk for days on feed and total dry matter intake. This however, may be attributed to the difference in initial weight rather than breed type. Average daily gain and ADFI were lower ($P < .01$) for hair sheep than for Suffolk and Rambouillet x Suffolk, and feed:gain ratio was higher ($P < .001$) for hair sheep than for Suffolk and Rambouillet x Suffolk. Feed efficiency data for treatment effects and breed effects are reported in Table 4 and 5.

Table 4. Treatment Effects on Feed Efficiency of Lambs Consuming Either Alfalfa or Bermudagrass at 10% of a Concentrate Diet

	Treatment		
Item	Alfalfa Diet	Grass Diet	SEM
Initial wt., kg	36.19[a]	37.41[a]	1.25
Days on feed	59.39[a]	55.74[a]	4.61
Daily gain, kg/d	0.318[a]	0.310[a]	0.018
Total dry matter intake, kg	85.08[a]	79.88[a]	5.83
Average daily feed intake, kg/d	1.45[a]	1.45[a]	0.015
Feed:Gain	5.02[a]	4.90[a]	0.298

[a,b]Means within the same row with different superscripts differ (P < .05) SEM =Standard Error of the Mean; n=30 for each mean

Table 5. Breed Effects on Feed Efficiency of Lambs Consuming Either Alfalfa or Bermudagrass at 10% of a Concentrate Diet

	Breed			
Item	Suffolk	Hair	Suffolk x Rambouillet	SEM
Initial wt., kg	38.63[a]	34.21[b]	37.55[a]	1.53
Days on feed	45.77[a]	76.26[b]	50.6[a]	2.56
Daily gain, kg/d	0.359[a]	0.245[b]	0.338[a]	0.022
Total dry matter intake, kg	67.56[a]	106.16[b]	73.71[a]	7.14
Average daily feed intake, kg/d	1.47[a]	1.40[b]	1.46[a]	0.018
Feed:Gain	4.23[a]	6.11[b]	4.54[a]	0.365

[a,b]Means within the same row with different superscripts differ (P < .05) SEM =Standard Error of the Mean; n=20 for each mean

Live weight, hot carcass weight, dressing percent, fat thickness, leg score, conformation, flank streaking, and quality grade were not significantly different (P < .05) between the treatment group and the control group. Live weight, hot carcass weight, dressing percent, leg score, and conformation were not different (P < .05) between hair, Suffolk, and Rambouillet x Suffolk lambs. However, Suffolks had less (P < .05) fat thickness than hair or Rambouillet x Suffolk lambs. Hair sheep had more (P < .05) flank streaking than Suffolk lambs and tended to have a higher quality grade (P < .06). Carcass caracteristic data for treatment effects and breed effects are reported in Table 6 and 7.

Table 6. Treatment Effects on Carcass Characteristics of Lambs Consuming Either Alfalfa or Bermudagrass at 10% of a Concentrate Diet

	Treatment		
Item	Alfalfa Diet	Grass Diet	SEM
Live weight at slaughter, kg	54.87[a]	55.28[a]	1.73
Hot carcass weight, kg	29.34[a]	30.00[a]	1.01
Dressing percent	53.53[a]	54.43[a]	1.26
Fat thickness, in.	0.256[a]	0.270[a]	0.025
Leg score	12.6[a]	12.73[a]	0.481
Conformation	12.53[a]	12.60[a]	0.458
Flank streakings	11.20[a]	11.21[a]	0.392
Quality grade	11.73[a]	11.54[a]	0.287

[a,b]Means within the same row with different superscripts differ (P < .05) SEM =Standard Error of the Mean; n=20 for each mean

Feeding systems that promote rapid lamb growth, such as concentrates fed in drylot, usually result in greater feed efficiency (McClure et al., 1994). Lambs fed in this trial were fed in a drylot situation to determine feed efficiency differences between concentrate diets containing either alfalfa pellets or bermudagrass-clipping pellets. No treatment differences were seen for any feed efficiency parameters or carcass characteristics. However, breed effects were significant for several factors.

Initial weight was lower ($P < .05$) for hair sheep than for Suffolk and Suffolk x Rambouillet. Because of this, days on feed and ADFI may be invalid when determining differences. Average daily gain was lower for hair sheep than for Suffolk and Suffolk x Rambouillet. This agrees with Wildeus (1997) stating that growth rates of hair sheep are generally lower than those of traditional wool breeds in the United States. Wildeus (1997) further stated that this difference can be partially attributed to the low input management systems and stressful tropical environmental conditions under which these breeds were developed.

ADFI was lower for hair sheep than for Suffolk and Suffolk x Rambouillet. This agrees with findings of Horton and Burgher, 1992 stating that DMI of high energy diets was lower ($P < .05$) in Saint Croix and Blackbelly Barbado lambs than in Dorset and Katahdin. Feed:gain ratio was higher for hair sheep than for Suffolk and Suffolk x Rambouillet. This contradicts the findings of McClure et al. (1991); Horton and Burgher, (1992); and Phillips et al. (1995) who claimed that Saint Croix and Blackbelly Barbado had similar feed:gain ratios to those of wool breeds. However, the ratios of Blackbelly Barbados and Blackbelly Barbado crosses were lower for feed:gain ratio (Shelton, 1983a; Horton and Burgher, 1992).

Live weight, hot carcass weight, dressing percent, leg score, and conformation were not different (P > .05) between breed groups. These findings are not unusual but there are not any consistent differences in dressing percent reported between hair and wool breeds (Wildeus, 1997). Fat thickness was less (P < .05) for Suffolk lambs than for hair and Suffolk x Rambouillet lambs. Data on differences in backfat thickness are also not consistent (Wildeus, 1997). Although, McClure et al. (1991) and Solomon et al. (1991) found increased backfat thickness (P < .01) in Targhee compared with Saint Croix, but these lambs had 20 to 30% lower slaughter weights. Flank streaking was higher (P < .05) for hair sheep when compared to Suffolk lambs, but not higher (P > .05) when compared to Suffolk x Rambouillet lambs. Quality grade was higher (P < .05) for hair sheep when compared to Suffolk lambs. Quality grade for hair sheep and Suffolk x Rambouillet lambs were not different (P < .05). Wilderus, 1997 also states that differences in quality grades are also inconsistent between hair and wool type sheep. Ockerman et al. (1982) found that Blackbelly Barbado had lower (P< .05) quality grades than Saint Croix and wool breeds. These lower grades may have been the result of a lower slaughter weight.

CONCLUSION

Bermudagrass clippings, as managed in this experiment, can be used as an alternative forage source in a concentrate diet for lambs. Feed efficiency and carcass characteristics were favorable for all lambs consuming the treatment diet. Breed effects tended to be significantly different (P < .05) for some feed efficiency as well as carcass characteristics. However, this was not due to the bermudagrass clipping or alfalfa pellet diet.

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