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Peanut Stover and Bermudagrass Hay for Wethers on Summer Hardwood Rangeland in North Central Texas

C.E. Packard[1], *J.P. Muir*[1], *R.D. Wittie*[2], *R.M. Harp*[2], *M. A. Carr*[3]

[1] *Texas A&M Agricultural Experiment Station, 1229 N. U.S. Hwy 281, Stephenville, TX 76401, USA. Phone: 254-968-4144; email: j-muir@tamu.edu*

[2] *Tarleton State University, Stephenville, TX*

[3] *Angelo State University, San Angelo, TX*

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Summary

Goats in the south-central United States raised on rangeland often face a mid-summer forage quantity and nutritive-value deficit that may be mitigated by feeding inexpensive hay or stover. Four wethers (Boer X Spanish goats) were assigned to wooded rangeland paddocks (eight head ha^{-1}, two replications) and supplemented with either peanut (*Arachis hypogea*) stover (10 percent crude protein (CP)) or coastal bermudagrass (*Cynodon dactylon*) hay (12 percent CP) at 0.5 percent or 2.0 percent BW with two unsupplemented paddocks as control treatments. The hay and stover were also fed to wethers *ad libitum* in a traditional feedlot and compared to a complete feed ration (four head pen^{-1}, two replications). For 10 weeks from July to September in 2002 (216 mm rainfall) and in 2003 (354 mm rainfall) average daily gains (ADG) were measured, while herbage availability, and ADF, ADL, NDF, and CP concentrations of the primary browse species were determined. Goats receiving 0.5 percent BW bermudagrass in 2002 had greater ADG than those in the control and 0.5 percent BW peanut paddocks ($P < 0.1$). There were no differences in ADG among goats fed 2.0 percent BW of bermudagrass and peanut stover or control animals in 2002. No differences in ADG were measured in 2003 when browse nutritive value was the same but quantity was 26 percent lower than 2002. Goats on the complete ration in the drylot had greater ($P < 0.1$) ADG than goats fed either hay or stover *ad libitum* both years. Goats on complete feed in the drylot had greater ($P < 0.05$) dressing percentages than animals fed either stover or hay (45 percent, 37 percent and 31 percent, respectively). Supplementing goats on hardwood range with bermudagrass hay at 0.5 percent BW improved ADG only when there were sufficient quantities of high-quality browse.

Keywords: Bermudagrass Hay; Peanut Stover; Wooded Rangeland; Daily Gain; Goats

Introduction

Stabilizing meat-goat prices (VDACS, 2006) and the introduction of Boer-goat genetics into the United States (Cameron et al., 2001), are factors contributing to an increased interest in meat-goat production. Historically, Texas meat goats have been raised almost exclusively on rangelands or in small holdings. Confined-finishing systems used for sheep and cattle in the United States are not considered effective for goats and are relatively new practices for the meat-goat industry (Machen et al., 2001). Therefore, very little information is available on the efficacy of supplementing hays or stovers (baled-crop residues) to meat goats on south-central U.S. rangeland (Machen, 2001).

Goats raised on rangelands in the south-central United States often face both forage-quantity and/or quality deficits from July through August, usually due to dry weather conditions. For example, the 30-year-average annual rainfall for Stephenville, Texas, is 762 mm (Figure 1), with July and August comprising the driest and warmest (Figure 2) months of the year (TAES, 2002). Prolonged drought conditions in the south-central United States since 1998 have led to a further reduction in forage availability and quality during July and August, resulting in economic losses for many producers (Hiler, 1998).

Supplementing or substituting browse during drought, when pasture- and rangeland-forage quantity and nutritive-value decrease, might improve goat productivity in the south-central United States. The question addressed in this study was whether the hays or stovers currently used complement rangeland browse. Studies have shown that stover or hay supplements to goats on mature grass pastures rarely increase ADG (Torto and Rhule, 1997), whereas high-CP supplements increase production, especially when the nutritive value of grass is low (Faftine et al., 1998). Supplementing goats on browse, however, can be different since browse in drought periods can still have high-nutritive value, albeit of insufficient quantity to keep animals growing (Schacht et al., 1992; Papachristou et al., 1999). In such situations, high-fiber supplements (rather than high-nutritive value material) may be more appropriate since goats consuming woodland browse select for CP but do not select against ADF concentrations (Ott et al., 2004). Browse of greater nutritive value than hays or stovers with elevated ADF concentrations may have a synergistic effect on the supplement by increasing the intake and digestibility of the hay or stover. Supplementing or substituting feed may also attenuate the impact of overgrazing on rangelands during drought months or years (Bodine et al., 2001).

This study evaluated coastal bermudagrass hay and baled peanut stover in two feeding systems for meat goats. One system was based on a hardwood rangeland, where the stover and hay supplemented or partially replaced native browse, while the other was a drylot system comparing formulated feed, hay, or stover fed *ad libitum*. The two hays selected for these trials are easily accessible to producers in the south-central United States and are being used increasingly by goat producers in the region. Critical questions addressed during the course of this study included animal performance and the efficiency of using hay or stover as goat feed, both as a sole feed, as well as in conjunction with browse in a hardwood rangeland.

Figure 1. Rainfall during 2002 and 2003 and the 30-year average at Stephenville, Texas.

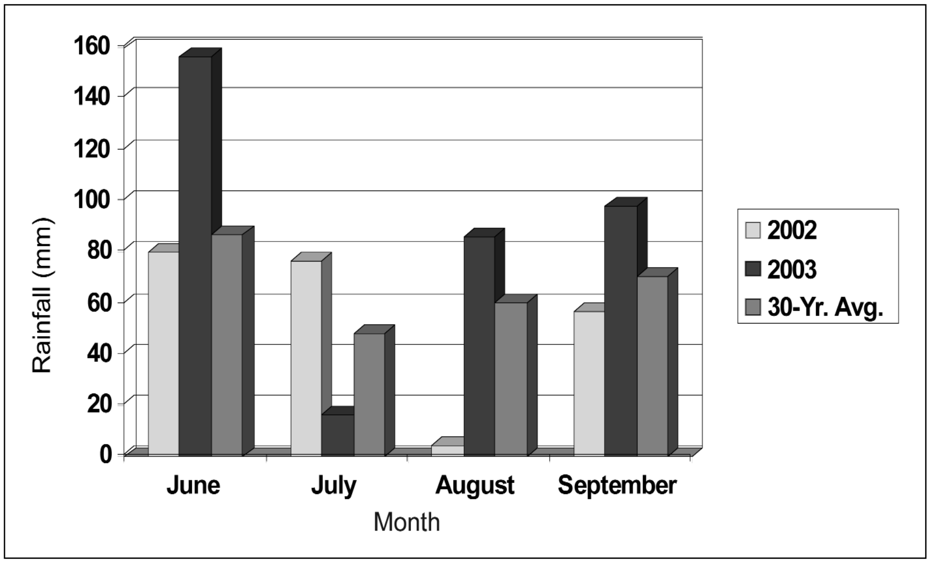
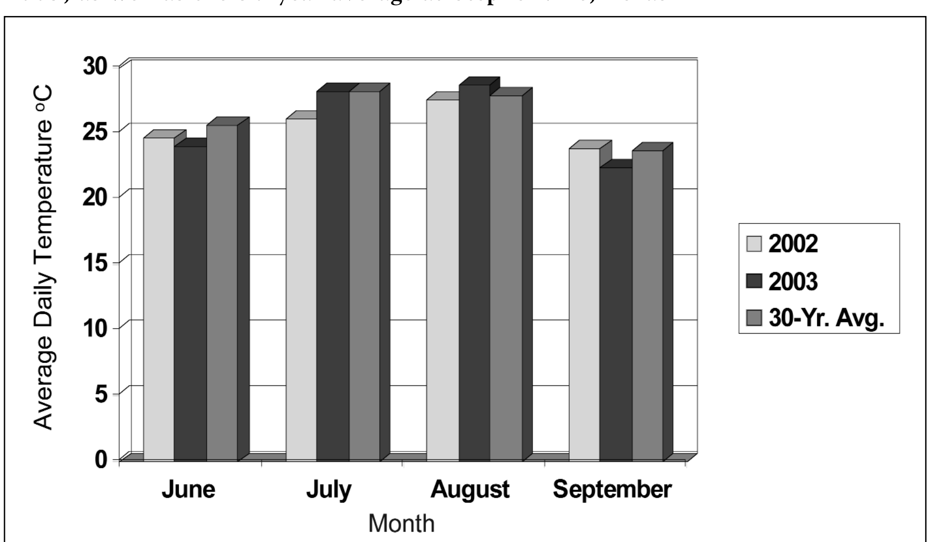


Figure 2. Average daily temperatures from June through September in 2002 and 2003, as well as the 30-year average at Stephenville, Texas.



Materials and Methods

The trial spanned the same 10-week period, from the third week in June to the second week in September, in the years 2002 and 2003. Sixty-four 5- to 6-month old Boer (75 percent) X Spanish wethers were obtained from the same Texas livestock producer each year (same four sires) and averaged 20±2 kg at the start of the trial in both years. All goats had been previously castrated and wounds were completely healed at the onset of the experiment. Ivermectin® was administered to all goats when fecal egg counts exceeded 500 g^{-1} in one or more animals (once in 2002 and twice in 2003) and antibiotics were administered to all animals when one or more showed symptoms of respiratory or intestinal distress (once in 2003). Water and salt were available throughout the trials. Seven days prior to the start of the trials, goats were weighed and randomly assigned to sixteen groups of four, assigned to the woodland trial or the drylot trial, and allowed a 7-day adaptation period.

Table 1. Crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and acid detergent lignin (ADL) of bermudagrass hay, peanut stover, and their refusals (dry matter basis) when fed to wether kids over two years at Stephenville, Texas.[a]

	Year	CP %	NDF %	ADF %	ADL %
Bermuda hay	2002	12.7±0.8	66.8±4.1	32.7±0.7	4.96±0.6
	2003	10.7±1.5	69.8±0.8	33.3±4.5	7.36±2.3
Bermuda hay refusals	2002	10.6±0.2	71.4±0.5	35.7±1.2	5.92±0.5
	2003	8.3±2.0	74.1±0.4	36.0±1.2	5.73±0.1
Peanut stover	2002	8.9±0.5	42.3±1.8	35.4±1.6	9.1±2.1
	2003	11.8±1.4	48.3±6.0	44.2±8.2	11.4±3.0
Peanut stover refusals	2002	6.2±0.7	55.9±6.8	46.7±3.2	6.20±0.7
	2003	7.9±2.1	56.8±3.6	45.1±8.4	7.87±3.6

[a] Means ± SE of 10 weekly samples.

Woodland trial

The trial site was a native, wooded rangeland located at the Texas Agricultural Experiment Station, Stephenville, Texas (32° 13'N/ 9° 12'W at 399 m elevation). Dominant browse species included herbaceous forbs (perennial legumes and grasses), shrubs (*Cetis* spp., 2900 stems ha^{-1}), vines (*Smilax* spp., 44000 stems ha^{-1}), and an overstory dominated by *Quercus virginiana* (800 trees ha^{-1}), *Quercus stellata* (2400 stems ha^{-1}), and *Ulmus* spp. (120 trees ha^{-1}) (Ott et al., 2004). The 30-year-average precipitation for June to September for the area is 256 mm, and rainfall for these months during the trial was 216 mm for 2002 and 354 mm for 2003. The 4.9 ha woodland was divided into ten paddocks, each approximately 0.49 ha with uniform species composition.

A group of four wethers was assigned to each of ten paddocks and supplemented with either peanut (*Arachis hypogea*) stover or coastal bermudagrass (*Cynodon dactylon*) hay (Table 1) at 0.5 percent or 2 percent of BW, with two control groups receiving no supplementation (two replications per treatment). Weekly feeding levels for each treatment were calculated from mean body weight in each paddock after a weekly weighing. Feed levels remained at that calculated amount until the following week's weighing and were then adjusted. All supplemented wethers were fed in hay troughs and refusals were collected and subtracted from the fed amounts to calculate the actual amount of hay consumed. Goats received their allotted supplementation/substitution diet once daily in the morning.

Goats were weighed using a Paul® portable small livestock scale with LCD digital readout and the mean of four wethers in each paddock used as a single data point. Data obtained was used to estimate ADG over the entire 10-week period each year. Following the weekly weighing, wethers were systematically rotated to the next paddock to ensure equal exposure to all paddocks.

One goat from each treatment/pasture and/or drylot pen was randomly selected for slaughter and carcass data collection at the end of 2003. These goats were transported to Rancher's Lamb of Texas, an abattoir in San Angelo, Texas. Shrinkage interval between penning and slaughter was 12 hours. Each carcass was tagged with the corresponding identification number, and weights were recorded prior to and following slaughter to determine dressing percentage of live weight.

Browse herbage samples were taken at three random points along the north and south diagonal transect in each paddock, thrice during the trial period: the first week of the trial, week six, and week ten. At each point, all available foliage below the browse line (1.5 m) was collected within a 1-m radius. Foliage from each point was hand-plucked to imitate how goats would browse the plants. Browse-herbage yields were reported as totals of all species combined. Because of the woodland canopy and goats' strong preference toward woody and forb species (Rodriguez and Kothmann, 1998), no attempt was made to quantify the sparse herbaceous material within the study area. Samples of hay were taken daily from the different supplementation/substitution treatments from each paddock. Refusals were collected daily before the goats received fresh supplement. Hay by type and refusals by treatment were batched by week (N = 10 yr^{-1}). Foliage, hay, and refusal collected from each paddock and drylot were placed in sample bags by type/species and dried at 55° C to a constant weight. Dried samples from each species were ground in a Wiley mill to pass a 1-mm screen and bottled for nutrient composition analyses in the laboratory.

Samples of the rangeland foliage, hays, and refusals were analyzed for concentration of N (A.O.A.C., 1990), NDF, ADF, and ADL as a percentage of dry matter (DM) (Van Soest and Robertson, 1980). Forage N concentrations were digested in an aluminum block digester (Gallaher et al., 1975) and mineral concentration of the digest was measured using semi-automated colorimetry (Hambleton, 1977) with a Technicon Autoanalyzer II. Percentage N estimates were then multiplied by 6.25 to estimate herbage CP concentration (Van Soest, 1994).

Drylot Trial

The drylot study was also located at the Texas Agricultural Experiment Station and consisted of six pens, each approximately 28 m^2 in size. Diet treatments were coastal bermudagrass, peanut stover or a commercially formulated feed (18 percent CP and 63 percent total digestible nutrients) offered *ad libitum* to four animals per pen. No additional supplement was given with the hay and no effort was made to equate CP or energy levels since the purpose was to compare pure hay or stover feeds with a balanced diet. Feeding regimes, feed sampling, laboratory analyses, as well as wether care and data collection were the same as in the woodland trial. Feed-conversion rates were calculated for the pen-fed animals (peanut, bermudagrass, and complete ration).

Statistical analyses

Each trial was analyzed as a separate experiment. The ADG values for the entire 10-week period were derived by averaging the ADG of all four wethers in each paddock or pen, with each treatment replicated twice. For carcass percent, only one wether from each paddock or pen was used as a data point, with each treatment replicated twice. Years and treatments (and years by treatment) were used as independent variables in the models when ADG values were submitted to analyses of variance, while only treatments were included in the model when analyzing carcass percent. Where appropriate, means were separated using a least significant difference (LSD) at $P < 0.10$. All other values are reported with standard deviations.

Table 2. Nutritive value of leaves from browse species consumed by goats in wooded rangeland over two years in Stephenville, Texas, pooled over weeks 1, 6 and 10 of the trial.[a]

	Year	CP %	NDF %	ADF %	ADL %
Ulmus spp.	2002	11.0±0.3	34.5±0.7	24.4±0.4	9.2±0.3
	2003	10.9±0.7	35.0±1.3	24.6±0.6	9.3±0.4
Celtis spp.	2002	9.8±0.1	39.8±0.7	27.5±6.3	9.0±0.3
	2003	9.6±0.6	39.5±1.6	27.4±2.7	8.6±1.8
Quercus spp.	2002	11.7±0.9	45.7±2.7	30.0±1.8	10.7±0.7
	2003	11.6±0.6	46.2±1.6	30.0±1.6	11.3±0.7
Smilax spp.	2002	11.7±0.4	47.5±2.3	30.5±0.4	9.6±0.5
	2003	10.6±0.5	46.7±1.7	35.0±1.9	14.8±1.5
Grasses	2002	9.5±0.8	63.5±1.3	39.0±0.4	6.0±0.7
	2003	7.2±0.3	71.9±0.9	32.3±2.4	5.7±0.4

[a] Means ± SE of 30 samples over 3 time periods.

Results and Discussion

Woodland trial

Browse nutritive value for the primary species (*Ulmus* spp., *Celtis* spp., and *Quercus virginiana*) in the woodland paddocks (Table 2) was consistent between years. This supports the findings of Tolera et al. (1997) who reported that most browse species maintain their nutritive value from year to year. The primary woody species were generally of greater nutritive value than the bermudagrass hay or the peanut stover. In contrast, viney (*Smilax* spp.) and herbaceous plants (grasses) decreased in both quantity and nutritive value from the first to the second year, despite greater rainfall in the second year. This was likely because of reduced plant nutrient reserves caused by the first year's browsing of these smaller, less deep-rooted species. Crude-protein concentration of viney plants, for example, decreased by 17 percent and grasses by 22 percent from the first to the second year.

Forage production and quality varies depending on precipitation, temperature, and grazing history (White and Richardson, 1999). In addition, plants grown at elevated temperatures generally produce lower-quality forage than plants grown under cooler temperatures (Ball et al., 2001). The average air temperature was greater in 2003 than in 2002 over the months of the trial, which may also have contributed to a decrease in the forage nutritive value. Greater air temperatures may also have caused the herbaceous plant material to mature earlier, thereby decreasing the quality of the forages (Bruinenberg et al., 2002).

Supplementation of low-quality diets can either improve intake of a basal diet (Pathirana and Orskov, 1995; Abdulrazak et al., 1997) or reduce intake (Getachew et al., 1994), depending on relative quality of the basal and supplemental feeds. Papachristou et al. (1999) suggested that woodland browse is an effective supplement to low-quality forages and that this seems to be a practical means of maintaining body weight of goats. Improvements in voluntary intake are often attributed to increased rates of forage digestion and digesta passage, which can promote improved BW gain and body condition in ruminants, such as cattle (Weder et al., 1999).

The quantity of accessible browse decreased from an estimated 991 kg ha^{-1} in 2002 to 737 kg ha^{-1} in 2003. This may explain how the 0.5 percent BW bermudagrass benefited the goats in 2002 but not in 2003 (Table 3; year by treatment interaction $P = 0.1$) due to insufficient high-quality browse in 2003 to stimulate passage rate of even small quantities of bermudagrass. Goats receiving 0.5 percent BW bermudagrass in 2002 had greater ADG than those in the control or 0.5 percent BW peanut paddocks ($P < 0.1$) while there were no differences ($P \geq 0.1$) in ADG among goats supplemented with the 0.5 percent BW bermudagrass, 2 percent BW bermudagrass, and 2 percent peanut stover in 2002. Goats receiving 0.5 percent BW peanut stover and 2 percent BW peanut stover in 2002 did not differ from animals in the control paddock.

There were no differences ($P \geq 0.1$) in wether ADG among treatments in 2003. This may be a result of decreased

Table 3. Wether kid average daily gains (ADG) on summer wooded rangeland fed bermudagrass hay or peanut stover at three different rates or in a dry lot fed solely formulated ration, bermudagrass hay, or peanut stover (year by treatment interaction *P = 0.10*).[a]

	2002	2003
	ADG g/day	
Rangeland		
Bermudagrass hay at 0.5% BW	50 ± 1^{bc}	36 ± 1^{b}
Bermudagrass hay at 2% BW	49 ± 5^{bcd}	35 ± 2^{b}
Peanut stover at 2% BW	46 ± 6^{cd}	32 ± 3^{b}
Unsupplemented control	35 ± 1^{d}	34 ± 4^{b}
Peanut stover at 0.5% BW	33 ± 4^{d}	33 ± 3^{b}
Drylot		
Complete pelleted ration	127 ± 2^{b}	82 ± 2^{b}
Peanut stover	37 ± 5^{c}	30 ± 4^{c}
Bermudagrass hay	31 ± 5^{c}	27 ± 1^{c}

[a] Means ± SE; N = 2 with 4 kids per N
[b,c,d] Values in the same year and trial differ only if followed by different letters according to a least significant difference multiple mean separation ($LSD_{0.05}$).

browse nutritive value (Table 2) and quantity in 2003 (737 kg ha^{-1}) compared to 2002 (991 kg ha^{-1}). Due to lower availability of browse in 2003, the quality of the native browse may have been insufficient to stimulate the digestibility of grass hay at both supplementation/substitution levels. First year results indicate that supplementation with bermudagrass hay at 0.5 percent BW may increase ADG over no supplementation only when there is sufficient high-quality browse, whereas greater amounts of hay may be less efficacious, by diluting the effect of high quality browse. Further research is required to determine whether increasing browse availability (achieved through lower stocking rates or by using previously unbrowsed, wooded rangeland) will improve goat ADG when bermudagrass is fed at rates greater than 0.5 percent BW.

No positive effects on ADG were observed with peanut stover supplementation or substitution compared to unsupplemented animals (Table 3), perhaps because nutrients in the stover did not complement those ingested in the browse. Warambwa and Ndlovu (1992), reported by Faftine et al. (1998), also found that peanut stover fed to goats resulted only in weight maintenance. In contrast, Manyuchi et al. (1997) found that it was possible to feed peanut stover in small amounts to improve nutrient intake when animals consumed poor quality forages. Ondiek et al. (1999) also reported improved live-weight gains in goats when legumes were used to supplement roughage-based diets, while Ahmed and Nour (1997) stated that goat production under natural, rangeland conditions would be improved by legume supplementation. Differences among these studies and our findings were likely due to the fact that the browse quantity and nutritive value in the present study were greater than poor-quality, grass basal diets used in other studies. When available in sufficient quantities in 2002, the high-nutritive value of native browse (Table 2) likely improved the digestibility of bermudagrass at the 0.5 percent BW but was insufficient to positively affect energy availability of the grass hay fed at the greater rate.

Hay or stover fed at lower rates was more efficiently consumed, since refusals were five to six times greater when hay or stover was fed at 2 percent compared to 0.5 percent BW (Table 4). There were no differences in percentage of refusals in each treatment between years. The 2 percent BW treatments of bermudagrass and peanut stover had the greatest refusal percentage (18 percent and 10 percent, respectively), indicating greater selectivity by the goats when fed greater amounts of hay or stover.

Chemical composition of the refusals was different from the fed material (Table 1). Bermudagrass hay rejected by goats was 23 percent lower in CP, 7 percent greater in NDF, 8 percent greater in ADF, and 9 percent greater in ADL concentration than the original fed hay. Likewise, peanut stover refusals were 22 percent lower in CP, 12 percent greater in NDF, 19 percent greater in ADF, and 21 percent greater in ADL concentration than the stover when fed. Feeding at 2 percent BW allowed the goats to select the feed lower in fiber components (but not CP) to complement the available native forage. Small ruminants are often better able to select specific feedstuffs based on their nutrient content,

Table 4. Percent refusal by wether kids of bermudagrass hay or peanut stover while on winter wooded rangeland or in a drylot.[a]

	2002	2003
	% refusal	
Pasture		
Bermudagrass hay at 0.5% BW	2 ± 1^{d}	4 ± 1^{e}
Bermudagrass hay at 2% BW	18 ± 2^{b}	14 ± 3^{c}
Peanut stover at 2% BW	10 ± 2^{c}	16 ± 4^{b}
Peanut stover at 0.5% BW	4 ± 4^{e}	5 ± 4^{d}
Drylot		
Peanut stover	21 ± 4^{b}	26 ± 2^{b}
Bermudagrass hay	12 ± 2^{c}	14 ± 1^{c}

[a] Means ± SE; N = 2
[b,c,d,e] Values in the same year and trial differ only if followed by different letters according to a least significant difference multiple mean separation ($LSD_{0.05}$).

spending more time searching through a large amount of vegetation for dietary items with desirable quality characteristics (Kronberg and Malechek, 1997). When feed quantities are low, however, their selectivity may be limited, explaining why goats in the 0.5 percent BW peanut stover and 0.5 percent bermudagrass paddocks consumed a greater proportion of supplement available, 98 percent and 96 percent for both years, respectively.

Goats consuming 2 percent BW peanut stover had 40 percent of their LW as carcass, greater ($P \leq 0.05$) than all other treatments (Table 5). This may be the result of the ingested peanut stover having a faster passage rate than the bermudagrass hay, resulting in lower rumen fill at the time of slaughter. At 37 percent carcass yield, goats consuming 0.5 percent BW bermudagrass and peanut stover were undifferentiated from the goats fed the control diet ($P \leq 0.05$). Animals offered 0.5 percent BW bermudagrass hay had greater carcass dressing percentages than goats fed 2 percent bermudagrass hay, again likely a result of greater rumen fill in the latter animals at time of slaughter. Although these data should be used cautiously due to low numbers of replication, conclusions are supported by Oman et al. (1999) and Warmington and Kirton (1990), who also found that nutrition can influence carcass-dressing percentage through variation in weight of gut contents.

Drylot trial

Sheridan et al. (2003) found that goats have a lower intake of concentrate diet compared to other domesticated ruminants, which may lead to poor performance in a feedlot. This did not appear to be the case in our study. On average, goats fed a complete feed ration in the drylot had over three times greater ($P < 0.1$) ADG than goats consuming *ad libitum* bermudagrass hay or peanut stover in 2003 and 2002, respectively (Table 3). These results agree with Kiesling and Swartz (1997) and Johnson and McGowan, (1998) who found that feeding ruminants a complete ration in a drylot/feedlot usually resulted in greater efficiency in gains and higher carcass scores than feeding forages alone. There were no differences ($P \geq 0.1$) in ADG between the goats receiving bermudagrass hay or peanut stover *ad libitum* in either year. It is not clear why ADG of goats on the complete ration was greater in 2002 than 2003 since nutritive value was similar, 18.6 percent CP, 39.1 percent NDF, and 25.2 percent ADF in 2002, and 18.2 percent CP, 37.9 percent NDF, and 26.0 percent ADF in 2003. Greater mean temperatures (Figure 2) and relative humidity due to greater rainfall (Figure 1) may have contributed to lower goat appetite and greater internal parasite load in 2003, but this question would need more research before reaching any conclusions.

As was the case in the woodland trial, chemical composition of the hay and stover refusals was different from the fed material (Table 1). Bermudagrass hay and peanut refusal chemical composition was similar to those measured for the woodland trial. Average refusal percentage, over both years, was 80 percent greater in the peanut stover pens compared to bermudagrass (Table 4). Goats tend to select forage with the greatest nutrient concentration: the leaves more than the stems, and the thin stems more than the thick ones (Owen et al., 1986; Narjisse, 1991; and Odo et al., 2001). This may explain the greater refusal percentage in the peanut stover pens since the stover had larger, thicker stems than did the bermudagrass hay.

Although goats in the peanut stover pens tended to consume less, there was no difference in ADG between pens, making conversion ratios of the stover more efficient than the hay. The conversion ratios for peanut stover were 14:1 in 2002 and 16:1 in 2003, while bermudagrass hay was 19:1 in 2002 and 20:1 in 2003, and the concentrate was 3:1 in 2002 and 5:1 in 2003. On a price (2003 Texas market) per LW basis, bermudagrass hay was approximately \$3.30 kg^{-1} of gain, while peanut stover cost approximately \$2.20 kg^{-1} of gain, and the concentrate was approximately \$0.66 kg^{-1} of gain.

Goats fed concentrate in the drylot in 2003 had 8 percent greater ($P < 0.05$) dressing percentage than animals fed peanut stover, which in turn, had 5.9 percent greater carcass dressing percentages than goats fed bermudagrass hay (Table 5). These results were similar to those of Kiesling and Swartz (1997) and Johnson and McGowan (1998). Results reported by McClure et al. (1994) also support the conclusion that the consumption of a balanced diet by small ruminants, in this case sheep, in feedlots resulted in greater gains and carcass scores than did the consumption of forages. The fact that goats fed peanut stover had greater dressing percentages than those fed bermudagrass hay would indicate that goats consuming bermudagrass hay had the lowest passage rate and greater rumen size at time of slaughter.

Table 5. Wether kid carcass percent on summer wooded rangeland fed bermudagrass hay or peanut stover at three different rates or in a dry lot fed solely formulated ration, bermudagrass hay, or peanut stover.[a]

	2003
	% carcass
Treatment	
Bermudagrass hay at 0.5% BW	38.5±2[c]
Bermudagrass hay at 2% BW	36.8±2[d]
Peanut stover at 2% BW	40.0±2[b]
Unsupplemented control	37.5±2[cd]
Peanut stover at 0.5% BW	37.6±3[cd]
Drylot	
Complete pelleted ration	45.0±3[b]
Peanut stover	37.0±2[c]
Bermudagrass hay	31.1±2[d]

[a] Means ± SE; N = 2
[b,c,d] Values in the same trial differ only if followed by different letters according to a least significant difference multiple mean separation ($LSD_{0.05}$).

Conclusions

The primary goal of this research was to determine whether feeding bermudagrass hay or peanut stover to goats, already a common practice in north-central Texas, affects wether ADG during summer months. Results were decidedly mixed, leaving in doubt whether or not the use of bermudagrass hay and peanut stover are effective for goats except, perhaps, in emergency situations, such as drought. The nutritive value and quantity of the woodland browse was a larger determining factor on goat ADG than the bermudagrass hay or peanut stover. Even the first year, when browse was more abundant, only smaller amounts of bermudagrass hay improved wether ADG, while greater quantities showed little benefit to ADG. Further research is needed to determine whether more abundant browse can combine with greater amounts of grass hay to further improve goat performance.

The wethers in the woodland trial exhibited good acceptance of the supplements, even though they showed little benefit from it in terms of ADG. Goats selected for finer stems, leaves, and nuts of the peanut stover while leaving thicker stems behind. This preference for the finer stems could also be seen with the bermudagrass hay. Goats in the drylot trial were even more selective in the forage material they consumed than those on rangeland, resulting in greater rates of refusal and less efficient use of the fed material.

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