

MEAT GOAT PERFORMANCE AND CARCASS PARAMETERS WHEN FINISHED ON ORCHARDGRASS, RED CLOVER, OR ALFALFA PASTURES



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ABSTRACT

The meat goat industry is growing rapidly in the U.S., particularly on small farms. There are a diversity of forage types and qualities used in meat goat production systems. Seventy-two Boer goats were used to evaluate weight gain and carcass parameters when growing goats were finished on alfalfa (*Medicago sativa* L.; ALF), red clover (*Trifolium pratense* L.; RCL), or orchardgrass (*Dactylis glomerata* L.; OGR) pastures without energy supplementation. Forage mass showed an interaction ($P < 0.001$) between treatment and time over the grazing season. Goat kids grazing RCL and ALF had higher BW than those grazing OGR throughout the grazing season. Average daily gain (ADG) was similar for ALF and RCL kids (mean 0.18 lb/d) and both were greater ($P < 0.001$) than OGR (0.11 lb/d). Carcass wt were similar for kids finished on RCL and ALF (mean 33.8 lb), but both were greater ($P < 0.001$) than kids grazing OGR (29.8 lb). Dressing percentage of RCL and OGR was similar (mean 51.7 %), but both were greater ($P < 0.05$) than ALF (49.8 %). Ribeye area was higher ($P < 0.01$) for kids finished on RC compared to ALF and OGR. Backfat measurements were not different (mean 0.05 in). Goats finished on ALF, RCL, or OGR pastures produced desirable finished BW and carcasses for the Muslim Halal ethnic market.

INTRODUCTION

The meat goat industry is growing rapidly in the U.S., particularly on small farms. Meat goat production in the U.S. almost exclusively used the Boer breed in order to take advantage of their meat-type conformation and heterosis derived from cross-breeding. Weight gains of over 200 g/d for Boer and Boer cross-breeds have been reported (McGregor, 1985). However, using simulation modeling, Blackburn (1995) reported that as the forage base (quality and quantity) changed from high forage to low forage, Boer goat performance ranked below the Spanish goat, suggesting that nutrient intake from low- to medium-quality grasses is insufficient to maximize growth potential for Boer and Boer-cross goats.

Alfalfa (*Medicago sativa* L.; ALF) is an important legume forage for many classes of livestock (Van Keuren and Matches, 1988) and ALF hay is often used to supply crude protein in finishing diets for small ruminants. Alfalfa is a tall growing, winter hardy plant that produces high yields and quality forage (Hoveland, 1992) and supports superior weight gains (Gelaye et al., 1990) in goat systems. Red clover (*Trifolium pratense* L.; RCL) grows well on fertile and moderately acidic soils and does well under rotational grazing (Taylor and Smith, 1995), and has higher rumen escape protein levels compared to alfalfa (Jones et al., 1995). Orchardgrass (*Dactylis glomerata* L.; OGR) is a major pasture grass in the northeastern United States (Hoveland, 1992).

OBJECTIVE

This experiment was conducted to evaluate meat goat weight gain and carcass characteristics when goat kids were finished on different pasture forages without energy supplementation.



Fig. 1. Goat kids grazing alfalfa paddock in September 2005. Growing goat kids were managed with rotational stocking with a target occupation period of 4 days per paddock.

MATERIALS AND METHODS

Pastures:

Established stands of:
Alfalfa (ALF) cv. Amerigraze
Red clover (RCL) cv. Royal Red
Orchardgrass (OGR) cv. Benchmark

Nine pastures (3 of each forage type were used).
Each pasture contained 0.5 acre and subdivided into ten 0.05-acre paddocks.

Forage mass determined weekly.

Animals:

72 growing meat goat kid wethers (avg initial wt 43.6 lb);
at least 3/4 Boer breeding.
Nine groups containing 8 animals each.
Each group was randomly assigned to a pasture.

Grazing initiated 6 June and continued until 5 October 2005.
Rotational stocking (target 4-d occupation period).

Pastures were mowed to a 3-in stubble height after each occupation.
Buffer pastures of prairie grass (*Bromus catharticus* Bahl.) were used.

Animals had access to water and mineral supplement at all times.
Animals were dewormed every 30 d.

BW recorded every 21 d.

Carcass:

REA and Backfat determined via ultrasound prior to slaughter.
Slaughtered at Packing Plant by the Muslim Halal way.
Shrunk BW, chilled carcass weight, REA, and KHP fat data recorded.

Statistics:

Performance and carcass data analyzed as a CRD using SAS.

RESULTS AND DISCUSSION

Forage resource influenced meat goat liveweight change over the grazing season (Fig. 2). Goat kids grazing RCL and ALF had higher BW than those grazing OGR on d 199, 220, 241, 262, and 278. Overall ADG was similar for ALF and RCL kids (mean 0.18 lb/d) and both were greater than OGR (0.11 lb/d).

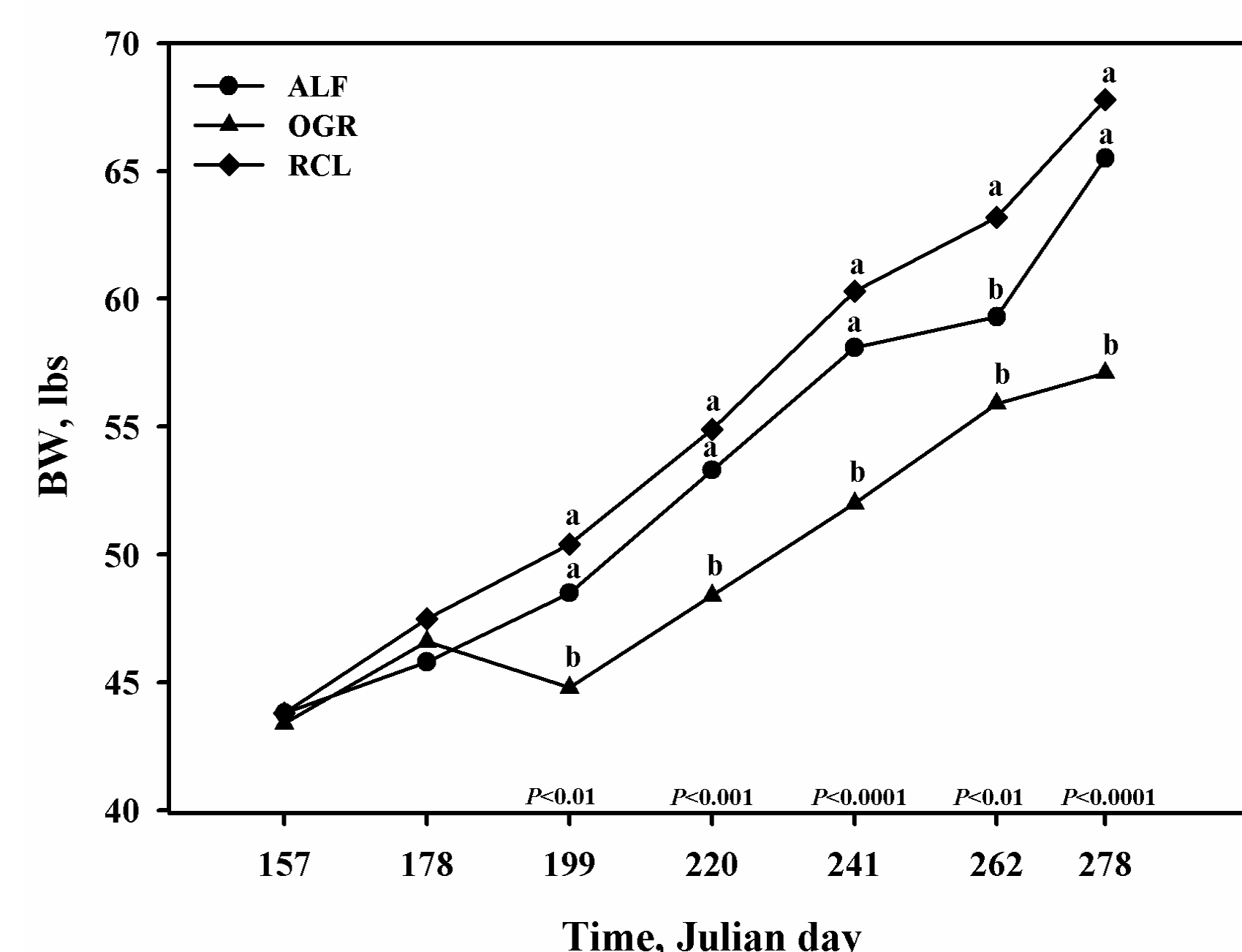


Fig. 2. Change in body weight (BW) over the 2005 grazing season when meat goat wethers were finished on alfalfa (ALF), red clover (RCL), or orchardgrass (OGR) pastures without energy supplementation.

Forage mass displayed a complex interaction between treatment and time ($P < 0.001$) across the grazing season, but tended to be numerically higher for RCL than for ALF or OGR in the last half of the season (Fig. 3).

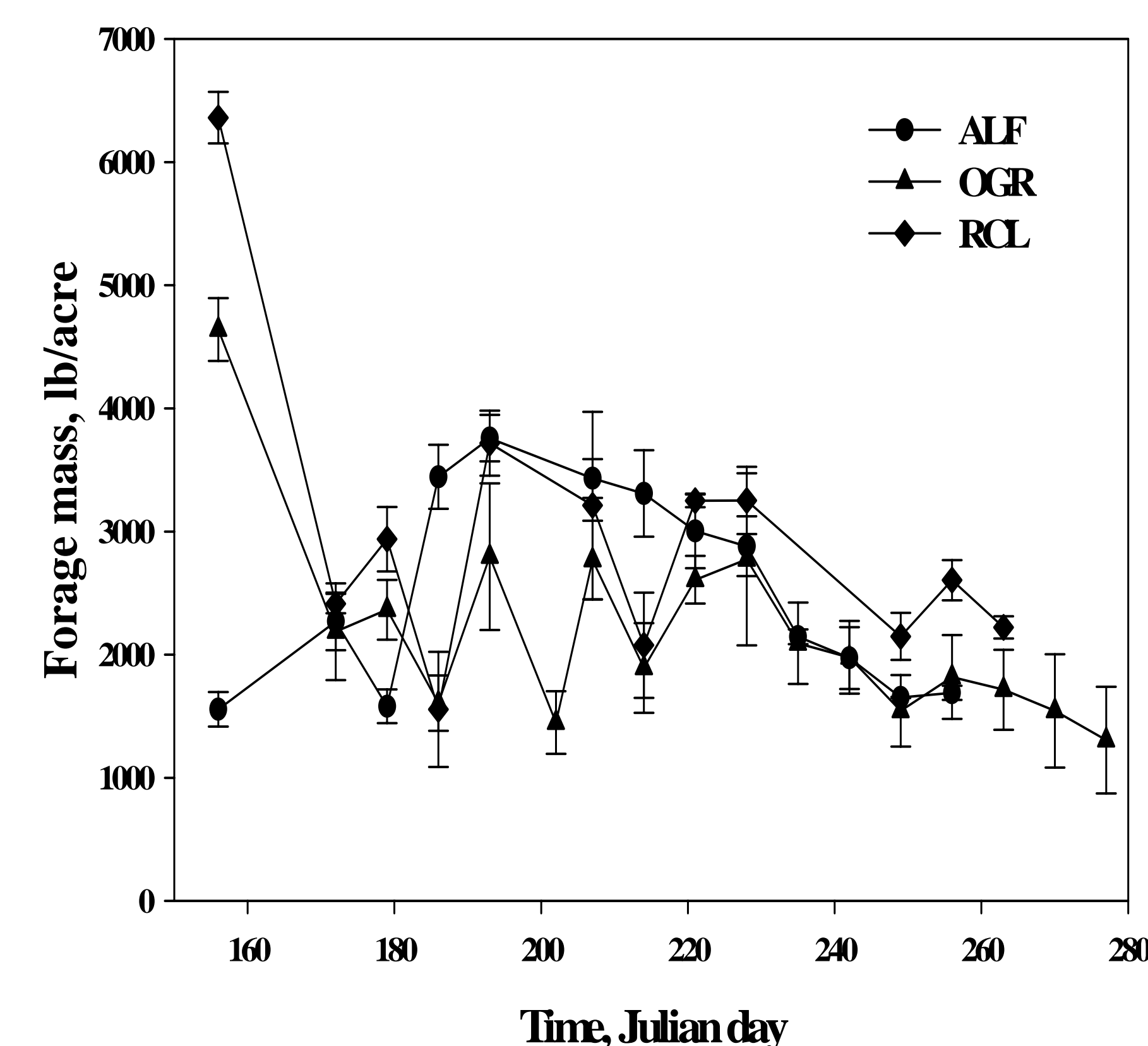


Fig. 3. Change in forage mass of alfalfa (ALF), red clover (RCL), and orchardgrass (OGR) pastures over the 2005 grazing season.

Final BW were similar for kids finished on RCL and ALF, but both were greater than kids grazing OGR (Table 1). Chilled carcass wt followed a similar trend. Dressing percentage of RCL and OGR was similar (mean 51.7 %), and both were greater than ALF (49.8 %). Ribeye area was higher for kids finished on RC compared to ALF and OGR. Backfat measurements were not different (mean 0.05 in).

Table 1. Final body weight (BW) and carcass parameters when meat goats were finished on alfalfa (ALF), red clover (RCL), or orchardgrass (OGR) pastures without grain supplementation in 2005.

Item	ALF	RCL	OGR	P level
Final BW, lb	65.5 ^a	67.8 ^a	57.1 ^b	<0.001
Chilled Carcass Wt, lb	32.6 ^a	34.9 ^a	29.8 ^b	<0.001
Dressing Percentage, %	49.8 ^b	51.3 ^a	52.1 ^a	<0.05
REA, sq in	1.19 ^b	1.32 ^a	1.11 ^b	<0.01
BF, in	0.047	0.051	0.048	NS
KHP fat, %	0.33 ^{a,b}	0.39 ^a	0.28 ^b	=0.05

^{a,b}Means within a row without a common superscript differ at the probability (P) level indicated.

Abbreviations: BW, body weight; REA, rib eye area; BF, backfat; KHP, kidney, heart, and pelvic fat.

Chilled carcass weight included the weight of the head, kidney, liver, and spleen.

REA and BF measurements were determined by ultrasound.

Results were similar to greater liveweight gains reported for lambs grazing forage legumes rather than grasses (Karnezos et al., 1994). Luginbuhl et al. (2000) reported an ADG of 0.22 lb/d when male weanling Boer and Boer crossbred goats were offered orchardgrass hay plus corn-soybean meal supplement versus an ADG of 0.37 lb/d on alfalfa. Fraser et al. (2004) reported lambs grazing red clover had higher weight gain than those grazing alfalfa or perennial ryegrass; alfalfa lambs gains were also greater than perennial ryegrass. Oman et al. (1999) reported similar REA and BF measurements for range-reared Boer x Spanish intact male goats.

There are many factors that affect ruminant performance when grazing pasture. Forage mass influences intake and ultimately performance. Lambs had greater intake of alfalfa or red clover in comparison to perennial ryegrass (Fraser et al., 2004). Alfalfa contains secondary plant compounds that are modified by rumen bacteria into estrogenic compounds such as comestrol (phytoestrogen; Saloniemi et al., 1995) and may increase weight gain in grazing animals. Red clover also contains phytoestrogens (i.e. equol) that are reported to increase weight gain (Moorby et al., 2004). In addition, red clover may improve weight gains via a polyphenol oxidase-mediated increase in rumen escape protein (Jones et al., 1995).

CONCLUSION

This was the first year of a 3-yr study to evaluate weight gain and carcass parameters when finishing meat goats on pasture. Goats finished on alfalfa, red clover, or orchardgrass pastures produced desirable finished body weights and carcasses for the Muslim Halal ethnic market.

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