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Growth and carcass characteristics of lambs sired by Dorper and Dorset rams¹

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ABSTRACT: Growth and carcass merit of Dorset (DO) and Dorper-sired (DP) lambs were compared over 3 yr in matings with 50% Dorset, 25% Rambouillet, 25% Finnsheep ewes. The DP were slightly lighter ($P = 0.09$) at birth than the DO lambs. In the first year of the study, DP lambs produced by AI using imported South African sires were heavier than DO lambs when weaned at 60 d of age (21.7 vs. 19.5 kg; $P = 0.05$). In yr 2 and 3, however, offspring of natural-service Dorper sires produced in the U.S. did not differ in weaning weight from DO lambs (16.9 vs. 17.8 kg; $P = 0.02$ for breed \times year interaction). Lamb survival was also affected by breed \times year interaction ($P = 0.04$). In 2000 and 2001, with 12 to 16% triplet or larger litters, mortality was higher for DP lambs (14.9 vs. 7.7%; $P = 0.12$). However, in 2002, with approximately 33% triplet or larger litters and with higher mortality levels in all birth types, DP lambs had fewer death losses than did DO lambs (23.2 vs. 36.1%; $P = 0.11$). No differences

between DO and DP lambs were observed in postweaning gain during summer grazing or in drylot in autumn. At chilled carcass weights of approximately 25 kg, DP lambs were somewhat fatter than DO lambs, with greater body wall thickness ($P < 0.01$; 22 vs. 19 mm) and slightly greater backfat thickness ($P = 0.15$; 6.4 vs. 5.5 mm) and yield grades ($P = 0.15$; 2.9 vs. 2.6). The DP lambs also had more desirable leg scores ($P = 0.01$; 11.6 vs. 10.9) and slightly larger LM area ($P = 0.13$; 14.1 vs. 13.5 mm²) than did DO lambs, confirming acceptable muscling and conformation in carcasses from Dorper-sired lambs. However, differences were not observed in the percentage of carcass weight in the leg or loin, or in the lean:bone ratio in the dissected leg. Ultrasonic measurements of backfat thickness and LM area taken in live lambs before slaughter were positively associated with direct measures on chilled carcasses with correlations of 0.77 for backfat thickness and 0.51 for LM area.

Key Words: Breeds, Carcass, Dorper, Growth, Sheep

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Introduction

High shearing costs, low prices for the medium wools that are characteristic of most U.S. meat sheep breeds, and a desire to capitalize on purported high levels of lamb and ewe vigor (Notter, 2000) have led to interest in use of hair sheep in U.S. production systems. The Dorper is a hair \times wool composite breed developed in South Africa from crosses between the Dorset Horn and the Blackhead Persian (Milne, 2000) and was imported into the United States in the early 1990s. It has been well received, in part because of apparent superiority

in conformation and muscling relative to other hair sheep breeds (Wildeus, 1997; Notter, 2000). Dorper sheep have been selected for a predominantly hairy coat, although many animals have fleeces containing a mixture of wool and hair fibers (Cloete et al., 2000). Shedding of wool in summer or following lambing is common, and shearing is not normally required.

The Dorper is a medium-sized breed with reported adult ewe weights of 52 to 74 kg in South Africa (Cloete and deVilliers, 1987; de Wall and Combrinck, 2000; Schoeman, 2000), where Dorper lambs are usually slaughtered at 32 to 35 kg to avoid excessive fatness (Cloete et al., 2000). Thus, under U.S. conditions, the Dorper is most likely to be used as a maternal breed in crossing with larger, leaner terminal sire breeds. Little information on the growth and carcass merit of Dorper-sired lambs in comparison with traditional U.S. maternal breeds is available in the scientific literature. This study, therefore, was designed to compare performance and carcass characteristics of lambs sired by Dorper and Dorset rams in matings with whitefaced commercial ewes.

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Table 1. Means for growth, survival, and ultrasonic (US) measurements in lambs sired by Dorset or Dorper rams

Variable	Year ^a	Dorper	Dorset	SE
No. born	All	181	262	
Birth weight, kg	All	3.57	3.75 [†]	0.08
No. weaned ^b	All	126	164	
Weaning weight, kg	2000	21.7	19.5*	0.8
	2001	19.4	19.6	0.5
	2002	14.3	16.0	0.9
	All	18.4	18.4	0.4
Summer gain, g/d ^c	All	187	185	12
Drylot gain, g/d ^d	All	142	148	8
No. with US measures	All	103	121	
US weight, kg ^e	2000	48.5	43.2*	1.5
	2001	37.6	39.8	1.5
	2002	40.5	40.0	1.2
	All	42.2	41.0	0.8
US backfat, mm ^f	All	3.86	3.43*	0.14
US longissimus muscle area, cm ^{2f}	All	12.1	12.0	0.1

[†]Breeds differ ($P < 0.10$).

*Breeds differ ($P < 0.05$).

^aMeans are shown by year only when year \times breed interaction was significant.

^bDecreases in lamb numbers from birth to weaning include the exclusion of late-born Dorset-sired lambs in 2000 that were not contemporary with early-born Dorper-sired lambs from synchronized AI matings.

^cFrom weaning until early September.

^dFrom early September until around November 1.

^eWeighted near November 1 at a mean age of 199 d.

^fAdjusted to a common live weight of 40.4 kg.

Materials and Methods

Animals

Dorset (DO) and Dorper (DP) crossbred lambs were produced in April and early May of 2000, 2001, and 2002 at the Southwest Virginia Agric. Res. and Ext. Center at Glade Spring by mating DO and DP rams to ewes of 50% Dorset, 25% Rambouillet, and 25% Finnsheep breeding (Table 1). Eight Dorper rams by eight different sires and eight Dorset rams by six different sires were represented (Vanimisetti et al., 2004). The DP lambs born in 2000 were produced by AI using semen from South African rams, whereas DP lambs born in 2001 and 2002 were sired by natural service using rams produced in the United States by grading up to imported stock. All DO lambs were produced by natural service.

Experimental Procedures

Ewes lambled outdoors but were maintained indoors with their lambs in small pens for 24 to 48 h after lambing. In 2000 and 2001, DO and DP crossbred ewe lambs were weaned at about 60 d and moved to drylot. However, in 2002, lambs weighed less at 60 d because of dry weather conditions and limited pasture growth and were creep fed for 1 mo before being weaned and moved to drylot at about 90 d of age. Lambs did not receive supplemental feed before weaning in 2000 or 2001. Ewe lambs were subsequently maintained in drylot and used to assess parasite resistance (Vanimisetti

et al., 2004). Wether lambs were weaned at approximately 90 d in all years and thereafter remained on native orchardgrass-white clover pastures. During the grazing period, wethers received a daily allocation of approximately 0.9 kg of supplemental feed/animal (as-fed basis) in 2000 and 2001, but were fed ad libitum in 2002 when pasture growth was limiting. The diet fed to ewe lambs and grazing wethers contained primarily corn, soybean meal, and soybean hulls and had approximately 14.5% CP, 23% crude fiber, and 72% TDN (on a DM basis). In all years, wethers were moved to drylot in early September and fed ad libitum until slaughter in early December at approximately 8 mo of age. The finishing diet was composed of (as-fed basis) 85% whole corn and 15% TEND-R-LAMB pellets (Southern States Cooperative, Richmond, VA) and contained approximately 14% CP and 87% TDN (DM basis).

All DO and DP lambs were weighed in mid to late June before ewe lambs were weaned, and this potential weaning weight was used to evaluate early lamb growth. In 2000, DO lambs born after April 20 were not directly contemporary with early-born DP lambs produced by AI and were excluded from postnatal growth analyses. Ewe lambs in drylot and wether lambs on pasture were weighed again around September 1, before movement of wethers from pasture to drylot. All lambs were also weighed around November 1, when ewe lambs were moved to breeding pastures. Daily gains during these two periods were used to measure post-weaning growth. In all years and at all times, lambs were moved directly from pasture or drylot to the weighing facility in midmorning and a single body

Table 2. Mean death losses (%) in lambs sired by Dorset or Dorper rams by year and type of birth

Litter size	Year	Mean \pm SE		
		Dorper ^a	Dorset ^a	All
1 or 2	2000	10.6 \pm 5.3 (21)	4.8 \pm 2.5 (89)	7.7 \pm 2.9
	2001	7.9 \pm 3.2 (76)	6.9 \pm 3.5 (58)	7.4 \pm 2.7
	2002	11.2 \pm 6.3 (37)	26.0 \pm 6.9 (31)	18.6 \pm 4.7
	All	9.9 \pm 2.9 (134)	12.6 \pm 2.7 (178)	11.2 \pm 3.7
3 or 4	2000	30.2 \pm 7.2 (7)	9.7 \pm 10.3 (21)	19.9 \pm 10.0
	2001	33.3 \pm 16.2 (10)	16.8 \pm 9.8 (37)	25.1 \pm 10.7
	2002	35.1 \pm 8.8 (30)	46.2 \pm 9.4 (26)	40.7 \pm 6.4
	All	32.9 \pm 8.4 (47)	24.2 \pm 5.7 (84)	28.6 \pm 5.3

^aNumbers of lambs born are shown in parentheses.

weight was recorded. For lambs that were not being fed ad libitum (i.e., grazing wethers in 2000 and 2001), feed was provided after weighing.

A single ultrasound image was collected between the 12th and 13th ribs for each animal around November 1 and used to determine fat thickness at the midpoint of the LM and LM area. Images were taken with an Aloka 500V real-time ultrasound machine (Corometrics Medical Systems; Wallingford, CT) equipped with a 12.5-cm, 3.5-MHz linear transducer. To ensure proper contact between the transducer and animal, the transducer was fitted with a Superflab stand-off guide (Mick Radio-Nuclear Instruments, Inc.; Bronx, NY). The area to be scanned was sheared before image collection, and vegetable oil was used as a couplant to obtain acoustic contact. When a suitable image was obtained, it was digitized and stored on a personal computer with a video frame grabber. Images were interpreted using commercial software (Rib-O-Matic ver. 2.0, Critical Vision, Inc., Atlanta, GA). All images were collected and interpreted by the same technician.

Approximately 12 wethers of each breed group in each year were delivered to the Virginia Tech Meat Laboratory in mid-December. Ultrasonic measures of backfat and LM area were taken on these animals within 24 h before slaughter for comparison with ultrasonic measurements taken in November and with actual measurements on chilled carcasses. Lambs were sheared before delivery, weighed after approximately 24 h without food, and then slaughtered. Carcasses were weighed before chilling and dressing percentage was calculated from the ratio of hot carcass weight to fasted slaughter weight. After approximately 24 h at 2°C, cold carcass weights were recorded and cooler shrink was calculated. Fat thickness perpendicular to the longissimus dorsi, LM area, and body wall thickness 12.5 cm off midline were measured between the 12th and 13th ribs. Yield and quality grades and leg conformation scores were assigned according to USDA standards (USDA, 1992). Fore- and hindsaddles were separated, and kidney and pelvic fat was removed from the hindsaddle and weighed. Loins (IMPS #232) were removed from each hindsaddle and weighed. The flank

was removed from the loin by a straight cut from a point 2.5 cm from the LM on both the rib and sirloin ends. The leg was separated from the sirloin by a straight cut perpendicular to the midline immediately anterior to the aitch bone. The tibia was removed from the leg by separation at the epiphyseal plate, and the Achilles' tendon was removed flush with the muscle surface. In 2001 and 2002, each leg was further physically dissected into muscle, fat, and bone. Whole muscles were trimmed of all visible external fat. Yield of leg muscle, fat, and bone was derived by dividing the weight of each component by the sum of the parts.

Statistical Methods

Body weights, growth rates, and ultrasonic measurements taken in November were evaluated for lambs of both sexes using a model that included fixed effects of lamb sex, breed group, year, and breed group \times year interaction and a random effect of sire nested within year and breed group. The model for ultrasonic measurements also included a continuous effect of body weight. Birth and weaning weights were adjusted to a twin lamb and adult (3 to 6 yr old) ewe basis before analysis using National Sheep Improvement Program multiplicative adjustment factors developed for the Polypay breed (Bradford, 2003). Preadjustment of weights was used because of low frequencies for certain groups (e.g., triplet lambs) and confounding among other groups (e.g., only a few ewe lambs nursed twins). Adjustment factors for survival traits were not available, so the initial model for survival to 14 d of age also included effects of litter size at birth (1, 2, or ≥ 3), age of ewe (1, 2, 3 to 6, or >6 yr), and interactions of litter size at birth with year and breed group. However, no important effects of ewe age ($P = 0.85$) or interactions involving litter size ($P = 0.39$ to 0.65) were observed, and these effects were deleted from the final model of lamb survival. Survival traits were also analyzed separately for lambs born in litters of less than or greater than and equal to three lambs.

Carcass and ultrasound measures taken on wethers at slaughter were analyzed with a model that included

fixed effects of breed group, year, and their interaction; a random effect of sire nested within breed group and year; and a continuous effect of live, hot carcass, chilled carcass, or total leg weight, as appropriate to the measurement involved (see Table 3). Breed group effects in all analyses were tested using the sire within breed group and year mean square.

Results and Discussion

Lamb Growth

Dorper-sired lambs tended to be lighter at birth ($P = 0.09$) than DO lambs (Table 1). A significant breed group \times year interaction was observed for weaning weight but not for other growth traits. In 2000, DP progeny of imported South African rams were significantly heavier at weaning than DO lambs, but differences in weaning weights between DP and DO lambs produced in 2001 and 2002 by natural service using commercially available Dorper and Dorset rams were not significant (Table 1). Postweaning growth rates did not differ between DO and DP lambs and were consistent across years.

Across the 3 yr, there were few indications of meaningful differences in growth potential between DP and DO lambs. The DP lambs sired by AI using imported rams in 2000 were superior in weaning weight (but not postweaning gain) to DO lambs, suggesting that there may have been more intense selection for growth in imported rams. Snowden and Duckett (2003) reported that lambs sired by Dorper rams had less rapid early growth (birth to 77 d) than lambs sired by Columbia or Suffolk rams, but did not observe significant breed effects on birth or 118-d weaning weights. Means et al. (1999) likewise reported that Dorper and Suffolk-sired lambs did not differ in postweaning gain when fed a high-forage diet, but Staab et al. (1999) reported somewhat higher postweaning gains ($P = 0.12$) for Suffolk-sired lambs than for Dorper-sired lambs when animals were fed a high-concentrate diet.

Lamb Survival

The analysis of lamb survival was dominated by large effects of litter size ($P < 0.001$) and year of birth ($P = 0.003$). No overall difference in lamb survival was observed between DO and DP lambs ($P = 0.70$), but a breed group \times year interaction was observed ($P = 0.04$). The proportion of ewes with triplet and greater births was much higher in 2002 (17% singles, 50% twins, 31% triplets, and 2% quadruplets) than in 2000 (38% singles, 49% twins, 12% triplets, and no quadruplets) or 2001 (20% singles, 64% twins, 15% triplets, and 1% quadruplets), and may have contributed to this interaction. In addition, less labor was available to monitor lambing in 2002 than in 2000 and 2001. Mean death losses in single and twin lambs were similar (10.9 ± 4.4 and $10.8 \pm 2.3\%$, respectively), and the frequency of quadruplet

Table 3. Means for carcass traits and ultrasonic measurements at slaughter for wethers sired by Dorset or Dorper rams

Variable	Breed group		SE
	Dorper	Dorset	
No. of lambs	37 (26) ^a	34 (23) ^a	—
Live weight, kg ^b	45.7	45.1	0.78
Hot carcass weight, kg ^c	25.9	26.2	0.3
Dressing percentage, % ^c	58.0	57.3	0.6
Chilled carcass weight, kg ^d	25.3	25.3	0.1
Cooler shrink, % ^d	2.69	3.03	0.21
Liver weight (hot), kg ^d	0.75	0.75	0.04
Liver percentage, % ^d	3.03	3.06	0.16
Ultrasonic backfat thickness, mm ^e	5.72	5.21	0.42
Ultrasonic loin muscle area, cm ^{2e}	14.3	14.0	0.2
Backfat thickness, mm ^e	6.36	5.54	0.37
Longissimus muscle area, mm ^{2e}	14.1	13.5	0.3
Body wall thickness, mm ^e	22.1	19.9**	0.5
Leg score ^{e,f}	11.63	10.85**	0.10
Quality grade ^{e,f,g}	11.31	10.98	0.16
Yield grade ^e	2.90	2.58	0.15
Kidney and pelvic fat weight, kg ^e	0.90	0.91	0.05
Kidney and pelvic fat, % ^e	3.50	3.54	0.20
Loin weight, kg ^e	2.43	2.39	0.07
Loin, % ^e	9.53	9.36	0.27
Leg weight, kg ^e	2.38	2.33	0.03
Leg, % ^e	9.94	9.73	0.13
Leg and loin, % ^e	18.80	18.57	0.20
Leg lean weight, kg ^h	1.64	1.66	0.01
Leg fat weight, kg ^h	0.30	0.26	0.02
Leg bone weight, kg ^h	0.41	0.43	0.01
Leg lean:bone ratio ^h	4.04	3.88	0.10
Leg lean, % ^h	69.94	70.55	0.56
Leg fat, % ^h	12.51	11.03	0.73
Leg bone, % ^h	17.55	18.48	0.43

**Breed groups differ ($P < 0.01$).

^aValues in parentheses are the numbers of lambs used for leg dissection in 2001 and 2002.

^bUnadjusted.

^cAdjusted for differences in live weight.

^dAdjusted for differences in hot carcass weight.

^eAdjusted for differences in chilled carcass weight.

^fLeg conformation score and quality grade based on a numeric score of 10 = low choice, 11 = average choice, 12 = high choice.

^gBreed \times year interaction ($P = 0.05$); see text for details.

^hAdjusted for differences in leg weight; measured only in 2001 and 2002.

litters was low (0.9%), so lamb survival data were re-analyzed separately for each year and for lambs born in litters of less than, or greater than and equal to, three (Table 2). Lambs born in litters of three or four had much higher death losses than lambs born as singles or twins (28.6 ± 5.3 vs. $11.2 \pm 3.7\%$, respectively, across breed groups and years; $P = 0.01$). Death losses in singles and twins were comparable between breed groups in 2000 and 2001 but increased substantially in 2002 for DO but not for DP (26.0 vs. 11.2%; $P = 0.12$). In triplets and quadruplets, death losses were considerably higher in DP than in DO in 2000 and 2001, but numbers of DP triplets in these years were low and differences were not significant ($P = 0.17$). In 2002, death losses of triplets and quadruplets were again substantially higher than those observed in 2000 and 2001

for DO ($46.2 \pm 9.4\%$) but not for DP ($35.1 \pm 8.8\%$; $P = 0.40$). This pattern was responsible for the observed breed group \times year interaction.

Death losses in lambs from triplet and larger litters have a critical impact on productivity in flocks of prolific ewes. If an increase in prolificacy results in an increase in triplet births and a corresponding decrease in the frequency of singles, the weaning rate for the flock can be increased so long as survival of triplet lambs exceeds 67%. However, if death losses in triplets exceed 33%, increasing prolificacy may not increase the number of lambs weaned (Shelton and Willingham, 2002). Mortality rates of 20 to 50% for triplet and quadruplet lambs are not uncommon. In previous studies at this location, mean death losses in triplet lambs produced by Finnsheep crossbred ewes ranged from 11 to 25% (Notter and Copenhaver, 1980; Cochran et al., 1984; Notter et al., 1991), and Cochran et al. (1984) reported death losses to 3 d of age of 36 to 59% in quadruplet lambs. At other locations, death losses of 12, 18, and 46% to weaning for lambs born in litters of one, two, and three or more, respectively, were reported by Iniguez et al. (1986) in California. In Minnesota, death losses to weaning in singles, twins, triplets, quadruplets, and quintuplets produced by purebred and crossbred Finnsheep ewes were 11, 24, 25, 38, and 29%, respectively (Oltenuacu and Boylan, 1981). High triplet and quadruplet death losses have often been reported in lambs from prolific Booroola Merino crossbred ewes. In Australia, death losses in offspring of Booroola Merino crossbred ewes ranged from 14 to 16% for singles, 14 to 33% for twins, 34 to 67% for triplets, and 60 to 61% for quadruplets (Owens et al., 1985; Kleemann et al., 1990; Fogarty et al., 1992). In a large New Zealand study including 1,776 triplet and 538 quadruplet lambs (Hinch et al., 1985), death losses to weaning in lambs born on pasture averaged 9.9% for singles, 19.1% for twins, 44.7% for triplets, and 53.6% for quadruplets; 78% of these deaths occurred within 2 d of birth.

One of the arguments for identification of easy-care sheep types is to facilitate maintenance of adequate survival rates in lambs from triplet and higher births. These data show no consistent advantage in survival for DP lambs. Under typical production conditions in 2000 and 2001, DP lambs were somewhat inferior to DO lambs. Assuming a constant ratio of single and twin to triplet and higher lamb birth types of 3:1, the mean predicted overall death rates of DP and DO lambs would have been 14.9 and 7.7%, respectively ($P = 0.12$). However, in 2002, DP lambs did not experience the increased death losses observed in DO lambs. At a ratio of single and twin to triplet and greater birth types of 1:1, mean predicted death rates of DP and DO lambs in 2002 were 23.2 and 36.1%, respectively ($P = 0.11$). Thus, some advantage may exist for DP lambs in situations with high potential mortality. Generally favorable effects of DP sires on lamb survival were reported from South Africa (Cloete et al., 2000; Schoeman, 2000), but

the number of comparisons is limited and most are restricted to lambs born as singles or twins.

Ultrasonic Measurements in Growing Lambs

Across years, DO and DP lambs were similar in BW in early November when ultrasonic measurements of body composition were obtained (Table 1). However, DP lambs were heavier in 2000 ($P = 0.02$) whereas DO lambs were slightly heavier in 2001 and 2002 ($P = 0.06$ for year \times breed group interaction). Ultrasonically determined backfat thickness was larger for DP lambs ($P = 0.04$), but LM area in November did not differ between DO and DP lambs.

Carcass Traits and Ultrasonic Measurements at Slaughter

Differences between DO and DP wethers in mean live weight at slaughter, hot and cold carcass weight, and leg weight were small, and breed \times year interaction was observed only for quality grade. Means for carcass traits and ultrasound measurements at slaughter were therefore averaged across years and adjusted to a common weight (Table 3). Differences in carcass characteristics between DO and DP lambs were small and generally not significant. Dressing percentages were based on sheared, shrunk live weights and included the kidney and internal fat with the carcass. They were therefore quite high, but did not differ between breed groups. At comparable weights, DP lambs had greater body wall thickness ($P < 0.01$) and higher leg scores ($P < 0.01$). They also had slightly greater backfat thickness ($P = 0.15$), higher quality and yield grades ($P = 0.16$), larger LM area ($P = 0.13$), and greater leg fat weight and percentage ($P = 0.19$). These results, coupled with the greater ultrasonic backfat thickness of DP lambs in November, suggest a slightly greater degree of maturity at comparable weights in DP lambs. The higher leg scores of the DP suggest favorable conformational characteristics relative to the DO. Differences between DO and DP lambs in ultrasonic measures of backfat thickness and LM area were consistent with but smaller than measured carcass differences. The breed group \times year interaction for quality grade ($P = 0.05$) revealed that DP lambs had substantially greater quality grades than DO lambs in 2001 (11.51 ± 0.24 vs. 10.71 ± 0.21) and 2002 (12.03 ± 0.23 vs. 11.25 ± 0.23), but were somewhat inferior to DO lambs in 2000 (10.42 ± 0.26 vs. 10.95 ± 0.25), when DP lambs were sired by imported South African rams.

Snowder and Duckett (2003) reported that Dorper-sired lambs had thicker backfat at the 13th rib and tailhead compared with Suffolk-sired lambs at the same slaughter weight, but they did not observe breed differences in body wall thickness, leg scores, or yield or quality grades. In contrast, Dorper-sired lambs finished on a high-forage diet in Wyoming had significantly higher leg scores than did Suffolk-sired lambs or West-

ern whitefaced lambs (Means et al., 1999). However, lambs of these three breed groups did not differ in backfat or body wall thickness or LM area. When lambs of these breed groups were finished on a high-concentrate diet, Dorper crosses had higher predicted yields of retail cuts than did Western whitefaced lambs ($P = 0.03$) but had lower quality grades ($P = 0.02$) than did Suffolk crosses (Staab et al., 1999).

Residual correlations between ultrasonic and direct measures of backfat thickness and LM area in wethers at slaughter were substantial ($P < 0.001$) and larger for backfat thickness (0.77) than for LM area (0.51). Correlations between ultrasonic measurements taken on wethers in November and at slaughter in December were likewise substantial ($P < 0.001$) and were again larger for backfat thickness (0.69) than for LM area (0.51). Correlations between backfat thickness and LM area were near zero for direct measurements taken on wethers at slaughter (-0.04 ; $P = 0.77$), but were larger for ultrasonic measurement in wethers at slaughter (0.27; $P = 0.03$) and in lambs of both sexes in November (0.16; $P = 0.02$).

Implications

Lambs sired by Dorper rams were generally similar in growth rate, lamb survival, and carcass merit to lambs sired by Dorset rams, although Dorper-sired lambs were slightly fatter at comparable weights. Carcasses of Dorper-sired lambs are thus anticipated to be similar to those of traditional U.S. maternal breeds. Ultrasonic measurements of backfat thickness and longissimus muscle area taken on live lambs before slaughter were positively associated with direct measurements on chilled carcasses and may be used to evaluate composition when direct measurements are not available.

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