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Carcass and Growth Characteristics of Wethers Sired by Percentage White Dorper or Hampshire Rams[1]

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Summary

To evaluate the use of percentage Dorper rams as terminal sires in the Upper Midwest, 72 Finn-Dorset-Targhee (FDT) ewes were mated to one of two 3/4 White Dorper-1/8 East Fresian-1/8 Corriedale (WD) rams and 77 FDT ewes were mated to one of two Hampshire rams in single-sire mating groups. Thirty-seven WD-sired and 55 Hampshire-sired wethers were utilized for the study. All male lambs were castrated by elastration at 1 day of age. Wethers were maintained as a group until slaughtered at a commercial packing plant. Carcass data were collected at slaughter. Hampshire-sired wethers tended to have greater birth weights (4.8 ± 0.14 kg vs. 4.4 ± 0.15 kg; P = 0.06) and had greater adjusted weaning weights (33.4 ± 0.85 kg vs. 30.4 ± 1.01 kg; P = 0.03) than WD-sired wethers. Hampshire-sired wethers had greater post-weaning average daily gain (0.36 ± 0.02 kg/day vs. 0.28 ± 0.01 kg/day, respectively; P = 0.0002), greater finished weights (57.8 ± 0.7 kg vs. 51.7 ± 0.8 kg, respectively; P = 0.0001), greater hot-carcass weights (29.1 ± 0.4 kg vs. 26.6 ± 0.5 kg, respectively; P = 0.0001), less fat over the ribeye (0.46 ± 0.02 cm vs. 0.55 ± 0.03 cm, respectively; P = 0.03) and thinner body walls (2.2 ± 0.06 cm vs. 2.5 ± 0.1 cm, respectively; P = 0.001) than WD-sired wethers. Hampshire-sired wethers grew faster and produced leaner carcasses than wethers sired by percentage WD rams.

Key words: Dorper, Hampshire, Growth, Carcass

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Introduction

Dorper sheep, a hair breed, have been reported to have high survival of lambs to weaning, the ability to breed out of season, and superior rates of gain and carcass characteristics relative to wool breeds in South Africa (Cloete et al., 2000; Elias et al., 1985; Schoeman, 2000). Schoeman (Schoeman, 2000) reported that growth rate of Dorper sheep was generally superior to that of wool and indigenous breeds and compared favorably with specialized mutton breeds. These reports have led to a great deal of interest in using Dorper and percentage Dorper animals in breeding programs in the Upper Midwest. However, most studies of Dorper performance have been conducted under animal management systems and climatic conditions differing greatly from the Upper Midwest.

Dorper lambs have a projected slaughter weight of 40 kg to 47 kg based on an adult ewe weight of 60 kg to 70 kg (Notter, 2000). Lambs in the Upper Midwest typically are slaughtered at weights between 50 kg and 68 kg. Optimum-slaughter weight and other traits of economic importance, including growth rate, mothering ability, and reproductive efficiency, have not been evaluated for Dorper sheep in the Upper Midwest. Therefore, we assessed the live performance and carcass characteristics of crossbred Dorper wethers in the farm flock program at the SDSU sheep unit in Brookings.

Materials and Methods

In the fall of 2001, 72 Finn-Dorset-Targhee (FDT) ewes were mated to one of two 3/4 White Dorper-1/8 East Fresian-1/8 Corriedale (WD) rams and 77 FDT ewes were mated to one of two Hampshire rams in single-sire mating groups A total of 55 Hampshire-sired and 37 WD-sired wethers were produced and evaluated in this study. All male offspring were weighed and castrated by elastrator at processing within 24 hours of birth. All lambs were raised as either singles or twins and had a pelleted, commercial, creep feed available *ad libitum*. Lambs were weaned at an average of 78 ± 1.6 days of age and weights were recorded. Wethers were maintained as one group on *ad libitum* feed until finished. Diets for the lambs consisted of a pelleted feed (20 percent protein; Big Gain lamb creep, Big Gain, Inc., Mankato, Minn.) available as creep feed until approximately two weeks before weaning, at which time the feed was switched to a grower ration that consisted of 62.5 percent cracked corn, 25 percent commercially available, pelleted-feed supplement formulated for growing lambs (pellets containing 16 percent protein, vitamins, and minerals; Big Gain lamb grower), and 12.5 percent oats. When lambs weighed approximately 45 kg, the diet was changed to a finisher diet that consisted of 72.5 percent cracked corn, 15 percent commercially available, pelleted feed formulated for finisher lambs (pellets containing 13 percent crude protein, vitamins, and mineral; Big Gain lamb finisher), and 12.5 percent oats. Weaning weights were adjusted for type of birth and rearing, age of dam, and sex of lamb, using generic breed adjustment factors to 78 days of age (*SID Sheep Production Handbook, 2002*). Weaning weights were adjusted to compensate for the low frequency of some group types (e.g. triplets). Lambs were slaughtered in two separate slaughter groups at a commercial processing plant (Iowa Lamb Corporation, Haywarden, Iowa). The first group (n= 26 Hampshire-sired and 15 WD-sired) was slaughtered (7/18/2002) and consisted of all lambs estimated visually and by palpation to have a minimum of 0.5 cm of fat cover (12 th- 13 th rib). The remaining lambs (n= 29 Hampshire-sired and 22 WD-sired) were slaughtered (8/22/2002) when 75 percent of them were assessed to have at least 0.5 cm of fat cover. Carcass traits (fat thickness over the ribeye, ribeye area, body-wall thickness, and USDA- yield and -quality grades) were recorded the day following slaughter. Percentage of boneless, closely trimmed, retail cuts was estimated from hot-carcass weight, fat depth, body-wall thickness, and ribeye area using the formula of Savell and Smith (1998). Data were tested for the effect of sire breed on lamb birth weight, adjusted-weaning weight, slaughter weight, post-weaning average daily gain, and hot-carcass weight by ANOVA using GLM procedures for SAS (1999). Effect of breed on carcass traits was tested by analysis of covariance with hot-carcass weight as the covariant, using GLM procedures for SAS. Effects of breed on USDA-quality grade was tested by chi-square analysis.

Results and Discussion

In the current study, WD-sired wethers tended to be lighter at birth than Hampshire-sired wethers (Table 1; P = 0.06). Notter et al. (2004) observed a tendency for Dorper-sired lambs to have lighter birth weights than Dorset-sired lambs; however, Snowder and Duckett (2003) reported no difference in birth weight between Dorper-, Columbia-, and Suffolk-sired lambs. Records from the South African Sheep Performance Testing Scheme indicated Dorper lambs had greater birth weights than Hampshire lambs; however, although these records contain a large number of observations (more than 117,000), the results could be biased by differences in production environments and management levels which were not accounted for (Schoeman, 2000). Furthermore, differences likely exist in the available WD genetics in the United States and South Africa.

Table 1. Effect of sire breed on lamb growth traits.

	Sire Breed		
Growth Trait	Hampshire	White Dorper	P-value
Number of head	55	37	------
Birth weight (kg)	4.8 ± 0.14	4.4 ± 0.15	0.06
Actual weaning weight (kg)	29.2 ± 0.85	27.1 ± 1.06	0.12
Adjusted weaning weight (kg)	33.4 ± 0.85	30.4 ± 1.01	0.03
Age at slaughter (days)	159.4 ± 2.2	165.3 ± 2.8	0.10
ADG (kg/day)	0.36 ± 0.02	0.28 ± 0.01	0.0002
Finished weight (kg)	57.8 ± 0.7	51.7 ± 0.8	0.0001

Hampshire-sired wethers had a greater adjusted-weaning weight than WD-sired wethers (Table 1; P = 0.03). Notter et al. (2004) reported greater weaning weights for Dorper-sired lambs than Dorset-sired lambs in one out of three years of their study. Snowder and Ducket (2003) observed greater 77 day weights in Columbia- and Suffolk-sired lambs than for Dorper-sired lambs but breed differences at weaning at 118 days of age were not significant. Schoenman (2000) reported that South African Sheep Performance Testing Scheme records indicated Hampshire lambs had heavier 42- and 100-day weights than Dorpers.

Hampshire-sired wethers had more than a 20 percent advantage in post-weaning, average-daily gain, which resulted in a heavier finished weight (Table 1; P < 0.0002). Snowder and Ducket (2003) observed higher finished weights in Dorper-sired lambs than Columbia- and Suffolk-sired lambs. However, Notter et al. (2004) did not observe a significant difference in post-weaning growth between Dorper- and Dorset-sired lambs. Dorper-sired lambs have been reported to have greater average-daily gain than western white-face lambs on a forage diet (Means et al., 1999). Staab et al. (1999) reported an advantage in average daily gain for Dorper-sired wethers over western white-face wethers initially, but Suffolk-sired wethers had superior overall average daily gain with no difference in overall average daily gain between Dorper-sired and western white-face wethers.

Hampshire-sired lambs had greater hot-carcass weights than WD-sired wethers (Table 2; P = 0.0001). Staab et al. (1999) did not observe a difference in hot-carcass weights between Suffolk-, Dorper-, or western white-face-sired wethers. Means et al. (1999) reported that Dorper-sired ewe lambs tended to have heavier carcasses than western white-face-sired ewe lambs. Snowder and Duckett (2003) observed greater hot-carcass weights in Dorper-sired lambs than Columbia or Suffolk-sired lambs.

In the current study, Hampshire-sired wethers had less fat than WD-sired wethers, as indicated by reduced fat depth over the ribeye and reduced body-wall thickness adjusted for hot-carcass weight (Table 2; P = 0.03). The WD-sired wethers also had higher USDA-yield grades assigned by the plant grader than Hampshire-sired wethers (Table 2; P = 0.04). Snowder and Duckett observed that Dorper-sired lambs had greater fat depth between the 12th and 13th rib than Suffolk-sired lambs and greater fat depth at the tail head than Columbia-sired lambs (2003). There was no difference in ribeye area adjusted for hot carcass weight between Hamshire-sired and WD-sired wethers (Table 2; P = 0.98). Notter et al. (2004) did not observe any differences in ultrasound estimates of longissimus muscle, cross-sectional area between Dorper-sired and Dorset-sired lambs. The lack of a difference in ribeye area between Hampshire- and WD-sired wethers indicates that Hampshire-sired wethers were very similar to WD-sired wethers in their degree of muscling. However, the differences in hot-carcass weight, fat depth, and body-wall thickness resulted in estimated higher percent boneless, closely trimmed retail cuts in Hampshire-sired wethers than WD-sired wethers (Table 2; P = 0.04). Staab et al. (1999) reported that Suffolk and Dorper-sired wethers had a greater estimated percentage of boneless closely trimmed retail cuts than western-white faced wethers.

All of the lambs in the current study graded USDA choice or prime (Table 2). There was no genotype difference in the percentage of lambs that graded USDA prime (P = 0.54; Table 2). Notter et al. (2004) observed higher-quality grades in Dorper-sired lambs than Dorset-sired lambs. Staab et al. (1999) found Suffolk-sired wethers had a higher-mean-quality grade than Dorper-sired wethers. But Snowder and Duckett (2003) did not find a difference in quality grade between Dorper-sired and Columbia-sired or Suffolk-sired lambs.

Table 2. Effect of sire breed on lamb carcass traits.

	Sire Breed		
Growth Trait	Hampshire	White Dorper	P-value
Number of head	55	37	------
HCW (kg)	29.1 ± 0.4	26.6 ± 0.5	0.0001
Fat (cm)*	0.46 ± 0.02	0.55 ± 0.03	0.03
Body Wall Thickness (cm)*	2.2 ± 0.06	2.5 ± 0.08	0.001
Dressing Percentage*	49.9 ± 0.2	52.0 ± 0.3	0.0001
REA (cm2)*	16.2 ± 0.2	16.2 ± 0.3	0.98
USDA Yield Grade*	2.2 ± 0.1	2.5 ± 0.1	0.04
% USDA Choice	92	88	0.54
% USDA Prime	8	12	0.54
Percent boneless, closely trimmed retail cuts*	46.9 ± 0.2	46.3 ± .2	0.04

*Values are means adjusted for the covariate (HCW) ± SE

Conclusion:

Although the percentage WD-sired lambs did produce acceptable carcasses at a finished weight within the range at which lambs are typically marketed in the Upper Midwest, the Hampshire-sired lambs had higher growth performance in the finishing phase and produced carcasses with less fat. This work suggests that Hampshire rams are superior to percentage WD rams as terminal sires.

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