

Evaluating the effect of South African Meat Merino breeding on pre- and post-weaning growth, feedlot performance, carcass traits, and wool characteristics in an extensive production setting

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Introduction

- Wool and lamb sales represent 6.5-13% and 76-83% of Western rangeland sheep producers income, respectively (LMIC, 2016)
- Terminal breeds improve lamb growth (Leeds et al., 2012; Notter et al., 2012) and carcass characteristics (Mousel et al., 2012 & 2013), but offspring fleece quality is greatly reduced (Scales et al., 2000)
- The South African Meat Merino (SAMM) is a white-faced, dual purpose sire breed and may improve lamb production traits without sacrificing wool quality

Objective



The objective of this study is to compare pre-and post-weaning growth, feedlot performance, carcass traits, and fleece characteristics of sheep reared by Rambouillet dams and sired by either Rambouillet, Suffolk, or SAMM rams.

Materials & Methods

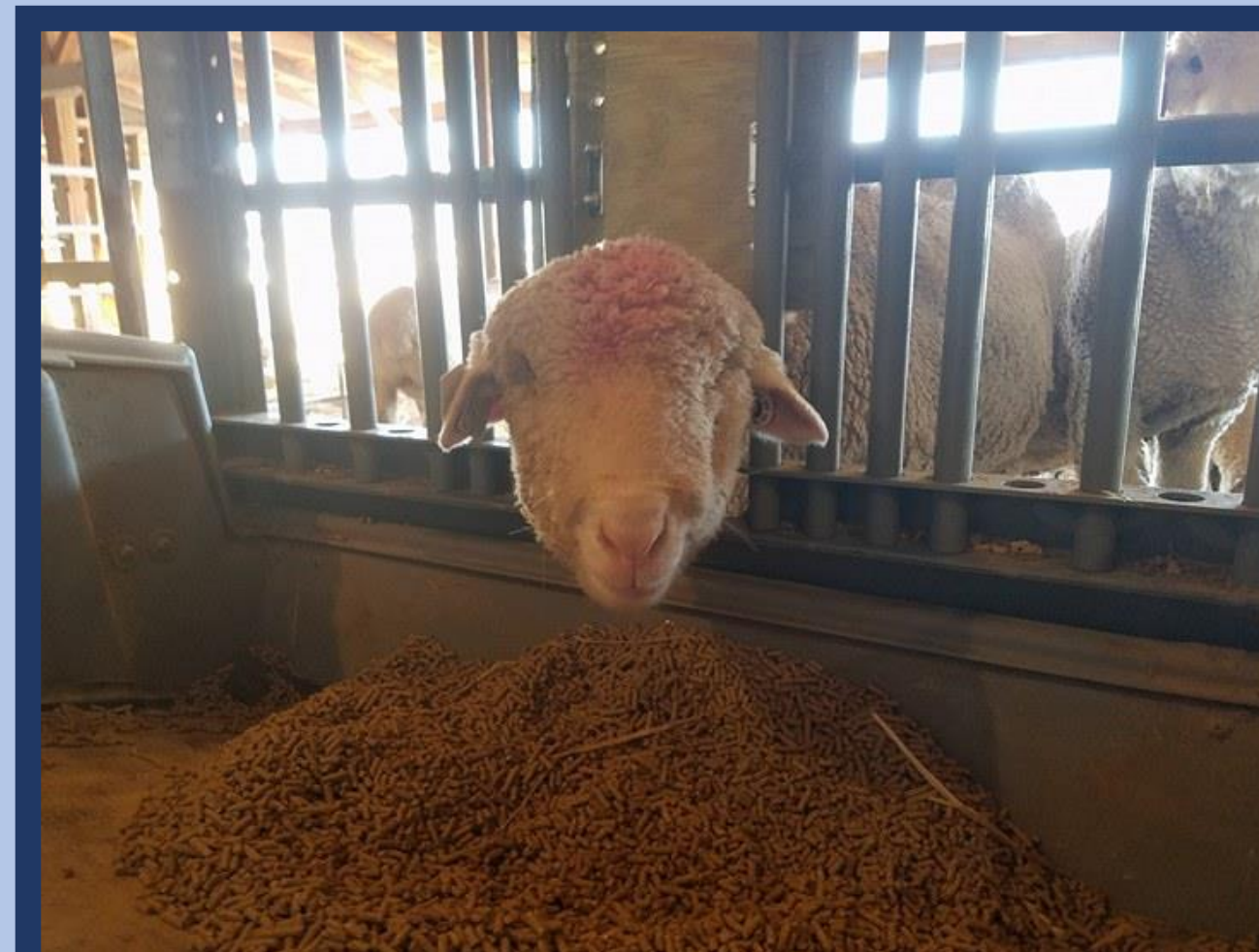
- Commercial Rambouillet ewes were exposed to either Rambouillet, SAMM, or Suffolk rams in November 2015 and 2016

Pre-Weaning Lamb Growth

- Lamb growth of Rambouillet, SAMM, or Suffolk sired lambs was measured with birth and 120 d (weaning) BW

Feedlot and Carcass Performance

- 3 months after weaning, 10 wether lambs from each sire group were placed in a single drylot pen equipped with four GrowSafe bunks (GrowSafe Systems Ltd., Airdrie, AB, Canada)
- Trial diet: 15.1% crude protein, 61.6% total digestible nutrients fed *ad libitum*



- Wethers were harvested following trial end

Replacement Ewe BW and Wool Characteristics

- Greasy fleece weight (GFW) and mid-side wool samples were collected at shearing from yearling and two year Rambouillet (n=45) and SAMM sired (n=37) replacement ewes
- Mean fiber diameter (MFD) and CV of fiber diameter (CV-FD) of the mid-side wool samples were measured on an OFDA 2000 (BSC Electronics Pty. Ltd., Attadale, Western Australia)

Results

Table 1. Least-squares means (\pm SE) for the main effects of birth type (BT) or rear type (RT), sex, and sire breed on lamb body weight (BW) in 2016 and 2017.

		2016		2017	
Effect	Level	Birth BW, kg	120 d BW, kg	Birth BW, kg	120 d BW, kg
BT, RT ¹	1	5.4 \pm 0.10 ^a	30.7 \pm 0.70 ^a	5.8 \pm 0.13 ^a	35.4 \pm 0.73 ^a
	2+	4.4 \pm 0.08 ^b	23.9 \pm 0.81 ^b	4.7 \pm 0.11 ^b	26.9 \pm 0.76 ^b
Sex	Ewe	4.7 \pm 0.08 ^b	26.5 \pm 0.77	5.0 \pm 0.10 ^b	30.5 \pm 0.69
	Wether	5.0 \pm 0.08 ^a	28.0 \pm 0.74	5.5 \pm 0.11 ^a	31.8 \pm 0.75
Sire breed ²	Rambouillet	4.8 \pm 0.07 ^b	27.4 \pm 0.70	4.9 \pm 0.12 ^b	31.0 \pm 0.89
	SAMM	5.0 \pm 0.07 ^a	27.1 \pm 0.81	5.2 \pm 0.15 ^b	30.4 \pm 0.93
	Suffolk	-	-	5.7 \pm 0.15 ^a	32.1 \pm 1.13

¹BT, RT= observed birth type for birth BW or rear type at for 120 d BW.

²Lambs sired by either Rambouillet, South African Meat Merino (SAMM), or Suffolk rams and raised by Rambouillet ewes.

^{a,b}Means within an effect and column are different ($P < 0.05$).

Table 2. Least-squares means (\pm SE) for the main effect of sire breed on feedlot performance and carcass characteristics.

Trait ²	Sire Breed ¹		
	Rambouillet	SAMM	Suffolk
Start BW, kg	39.0 \pm 0.72	38.7 \pm 0.72	39.7 \pm 0.72
End BW, kg	60.8 \pm 1.06	60.3 \pm 1.06	62.7 \pm 1.06
ADG, g d ⁻¹	245.8 \pm 8.6	241.3 \pm 8.6	258.5 \pm 8.6
FCR	10.6 \pm 0.37	10.7 \pm 0.37	10.3 \pm 0.37
DP, %	50.0 \pm 0.51 ^b	51.2 \pm 0.48 ^b	53.7 \pm 0.48 ^a
Leg, kg	4.90 \pm 0.11 ^b	4.99 \pm 0.10 ^b	5.53 \pm 0.10 ^a
Loin, kg	2.80 \pm 0.08 ^b	2.78 \pm 0.08 ^b	3.11 \pm 0.08 ^a
Rack, kg	2.62 \pm 0.06	2.54 \pm 0.06	2.68 \pm 0.06
LEA, cm ²	15.2 \pm 0.37	15.68 \pm 0.37	16.39 \pm 0.37

¹Lambs sired by either Rambouillet, South African Meat Merino (SAMM), or Suffolk rams and raised by Rambouillet ewes.

²Start BW = BW at the start of the trial; End BW = BW at the end of the trial; ADG = average daily gain; FCR = feed conversion ratio; DP = dressing percentage; Leg, Loin, and Rack = weight of leg, loin, and rack, respectively; LEA = loin eye area.

^{a,b}Sire breed means within a trait are different ($P < 0.05$).

Table 3. Least-squares means (\pm SE) for the main effects of sire breed and ewe age on yearling GFW, MFD, and CV-FD.

	Level	Trait		
		GFW, kg	MFD, μ m	CV-FD, %
Sire breed ¹	Rambouillet	2.0 \pm 0.06	19.9 \pm 0.38 ^b	17.6 \pm 0.44
	SAMM	2.0 \pm 0.06	22.0 \pm 0.40 ^a	17.0 \pm 0.46
Age of ewe, yr	1	1.4 \pm 0.06 ^b	19.7 \pm 0.32 ^b	17.9 \pm 0.38 ^a
	2	2.7 \pm 0.06 ^a	22.2 \pm 0.40 ^a	16.6 \pm 0.40 ^b

¹Ewes sired by either Rambouillet or South African Meat Merino (SAMM) and raised by Rambouillet ewes.

^{a,b}Means within an effect and column are different ($P < 0.05$).

Statistical Analyses

- Lamb BW at birth (n=405) and 120 d (n=305) was analyzed within the fixed effects of sire breed, sex, dam age, and birth or rear type and the random effects of dam and sire (v. 9.4; SAS Inst. Inc., Cary, NC)
- Feedlot lamb BW, average daily gain (ADG), feed conversion ratio (FCR), and carcass characteristics were analyzed with the fixed effect of sire breed
- Yearling BW and wool characteristics were analyzed with the fixed effect of sire breed and the random effect of sire

Implications

- The SAMM is a relatively new addition to the U.S. sheep industry and has not been extensively compared to breeds commonly used in Western sheep production
- Results indicate that 120 d BW and carcass characteristics were similar between purebred Rambouillet and SAMM x Rambouillet lambs
- Rambouillet sired ewes were heavier as yearlings and had lower MFD than SAMM sired ewes
- Results should be interpreted judiciously as a preliminary component of a multi-year study evaluating lifetime lamb and wool production of SAMM cross ewes is ongoing with this project.



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