Growth and Carcass Characteristics of Rambouillet, Dorset x Rambouillet and Romanov x Dorset-Rambouillet Ewes from Fall Lambing

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Story in Brief

Rambuillet, Dorset x Rambouillet and Romanov x Dorset-Rambouillet ewes were evaluated for growth and carcass performance. Ewes were mated to Hampshire and Suffolk rams, but Suffolk was the predominant breed. The total number of lamb records used in this study was 870 for growth and 605 for carcass traits. The traits analyzed were lamb birth weight and weaning weight, hot carcass weight, ribeye area, fat thickness, dressing percentage, leg conformation, flank fat streaking and conformation. Lambs were born during fall lambing season during the years 1994 to 1996. Dorset x Rambouillet ewes were superior for lamb birth weight, weaning weight, hot carcass weight and ribeye area.

Key Words: Sheep, Crossbred Ewes, Growth, Carcass

Introduction

Growth and carcass traits are economically important to sheep producers. Producers want lambs to reach market weight as early as possible to save on feed costs. The purpose of a selection program for improved carcass merit is to produce more valuable carcass. Heritability for growth trait is considered moderate. This means any selection program that focuses on growth rate usually results in rapid genetic gain. However, many non-genetic factors (sex of lamb, year, age of dam, season, type of birth) can also affect growth traits in sheep production. Carcass traits have moderate to high heritabilities, suggesting that a selection program that emphasizes carcass traits can result in significant genetic improvement. The purpose of this paper is to report the growth and carcass characteristics of Rambouillet, Dorset x Rambouillet, and Romanov cross ewes as dams of crossbred fall born lambs.

Materials and Methods

The data used in this study were obtained from the USDA-ARS Grazinglands Research Laboratory near El Reno, Oklahoma, during fall lambing seasons from 1994-1996. The dams used to generate crossbred lambs were Dorset x Rambouillet (DR), Rambouillet (RAMB) and Romanov cross (ROM: Romanov x Dorset-Rambouillet) ewes. Ewes ranged in age from 2 to 5+ yr. The total number of lamb records used in this study was 870 for growth traits and 605 for carcass traits.

Ewes were mated to rams for 45 d beginning on May 1 of each year. Hampshire and Suffolk rams were used, but Suffolk was the predominant ram breed. Ewes were fed corn, for flushing, 2 wk prior to introduction of rams. Warm season grass (Bermudagrass or Tall Grass Native Range) and cool season grass (Wheat) pastures were used to support the flock. Grass hay was provided when forage production was lower than animal needs. Ewes were checked for pregnancy by ultrasound 35 d after the rams were removed. Non pregnant ewes were removed. They were given the opportunity to breed in August, and if they conceived, they became a spring

lambing ewe. If they weaned a lamb early enough the following spring, they could be exposed to a ram in May to try to re-enter the fall lambing flock. If they did not breed in August they were sold. Ewes were moved to the lambing barn approximately 30 d prior to lambing and fed corn and soybean meal daily to meet late gestation nutritional requirements. Once the ewe had lambed, she and her lambs were placed in a small pen (4x4 ft) for 24 to 48 h and then in a mixing pen for 3 to 4 d. Male lambs were castrated, and all lambs were tagged and tattooed in the small individual pen. At the same time, birth weights were collected. From lambing to weaning, ewes and their lambs were maintained on wheat pasture and supplemented with hay when snow covered the wheat. Lambs had access to a creep diet while nursing their dam on wheat pasture.

Lambs within a lambing group were weaned on the same day regardless of age. Lambs were separated from their dams, vaccinated for overeating disease and returned to the wheat pasture and creep feeder. Using the weaning data, lambs were blocked by sex and ewe breed and ranked by weaning weight within block. Within each block, lambs were randomly assigned to be finished in the feedlot or on wheat pasture with ad libitum access to the same diet in the feedlot. In the feedlot, lambs within each block were fed in separate pens to determine feed intake. Lambs were fasted for 16 h before the initial and feedlot weights were taken. When 80% of lambs had reached a weight of 100 lbs the feedlot portion was terminated. Lambs weighing 100 lbs were transported to Greely, Colorado for processing. Colorado State University provided assistance in the collection of carcass data.

Data for each lambing record included dam id, lamb id, ewe breed, age of dam, lambing date, sex of offspring, type of birth (born as single and born as multiple), birth weight, weaning weight, final weight, weaning date, year of birth/lambing, hot carcass weight, ribeye area, fat thickness, dressing percentage, leg conformation, flank fat streakings, and conformation.

Traits subjected to statistical analysis were: birth weight (BWT)- weight of individual lamb taken within 24 hr of birth, adjusted weaning weight (ADJWW) - weight of individual lamb at weaning adjusted to a common age of 90-d, hot carcass weight (HCW), ribeye area (REA) - average area of the right and left ribeye or longissimus muscle as square inches, adjusted fat thickness (ADJFAT) - measured as inches at the 12th rib, dressing percentage (DP), leg conformation (LEG) - the degree of muscling in the leg expressed in terms of one-third of a conformation grade ; measured as $Prime^{+}$ = 15, Average Prime = 14, $Prime^{-}$ = 13, $Choice^{+}$ = 12, Average Choice = 11, $Choice^{-}$ = 10, flank fat streakings (FFS) - fat deposits visible on the inside surfaces of primary and secondary flank muscles ; measured as $Prime^{+}$ = 15, Average Prime = 14, $Prime^{-}$ = 13, $Choice^{+}$ = 12, Average Choice = 11, $Choice^{-}$ = 10 and conformation (CONF) - a subjective evaluation of relative distribution of muscling, especially in the leg, loin, rack, and shoulder regions ; measured as $Prime^{+}$ = 15, Average Prime = 14, $Prime^{-}$ = 13, $Choice^{+}$ = 12, Average Choice = 11, $Choice^{-}$ = 10.

All traits were analyzed by least squares analysis of variance. Terms included in the statistical models were the main effects of breed group of dam, year of birth, age of dam, type of birth, sex of lamb as well as appropriate two-way interactions.

Results and Discussion

Least squares means for BWT and ADJWW are presented in Table 1. DR ewes had the heaviest lambs at birth and weaning compared to other two breeds. DR and RAMB lambs were heavier at birth and weaning than ROM lambs (P<.05). However, there was no significant difference between DR and RAMB lambs at birth and weaning. Sex of lamb influenced (P<.01) BWT, but not ADJWW. Male lambs were heavier than female lambs at birth. Weights of the male and female lambs were similar at weaning. Type of birth also had an effect (P<.001) on growth weight. Lambs born as multiples were lighter than lambs born as singles at both birth and weaning.

Table 1. Least squares means and standard errors for lamb birth weight (BWT) and adjusted weaning weight (ADJWW)

	BWT (lb)			ADJWW (lb)		
Source of variation[a]	n	LSMeans	SE	n	LSMeans	SE
Ewe breeds		*			*	
DR	306	9.96[b]	.39	284	63.25[b]	1.66
RAMB	251	9.85[b]	.43	216	62.32[b]	1.90
ROM	313	9.24[c]	.41	287	59.09[c]	1.98
Sex of lamb		**				
female	457	8.80[b]	.50	410	60.58	1.68
male	413	10.56[c]	.54	377	62.51	1.71
Type of birth		***			***	
single	404	10.57[b]	.41	368	67.14[b]	1.76
multiple	466	8.79[c]	.37	419	55.96[c]	1.71

[a]DR = Dorset x Rambouillet; RAMB = Rambouillet; ROM = Romanov x Dorset-Rambouillet.

[b,c]Means within a column in a subgroup with different superscripts differ (P<.05).

[*]P<.05, [**]P<.01, [***]P<.001.

Least squares means for carcass traits are presented in Table 2 and 3. Ewe breed differences were observed only in HCW and REA. DR crossbred lambs produced the heaviest (P<.05) HCW and the largest REA (P<.01) than RAMB and ROM lambs. No significant differences were observed between RAMB and ROM lambs for both HCW and REA. Type of birth did not have effect on HCW and REA while sex of lamb had only effect on REA where male lambs had larger longissimus muscle than female lambs (P<.001). ADJFAT, DP, LEG, FFS, and CONF were not different for ewe breed group, type of birth and sex of lamb except that single born

lambs had higher fat thickness than multiple born lambs (P<.001). Overall The Dorset cross ewes were superior in birth weight and weaning weight, as well as having better carcass composition that make them attractive for Oklahoma sheep producers.

Table 2. Least squares means and standard errors for hot carcass weight (HCW)[b], ribeye area (REA)[c] and adjusted fat thickness(ADJFAT)[d]

	HCW			REA			ADJFAT		
Source of variation[a]	n	LSMeans	SE	n	LSMeans	SE	n	LSMeans	SE
Ewe breeds		*			***				
DR	222	63.27[e]	4.94	223	2.64[e]	.06	223	.29	.01
RAMB	176	57.71[f]	5.28	177	2.54[f]	.07	177	.27	.01
ROM	205	57.62[f]	5.20	205	2.47[f]	.07	205	.27	.01
Sex of lamb					**				
female	315	54.42	5.13	315	2.50[e]	.06	315	.28	.01
male	288	64.65	6.32	290	2.60[f]	.06	290	.28	.01
Type of birth								***	
single	298	63.37	3.23	298	2.62	.04	298	.29[e]	.01
multiple	305	55.70	9.34	307	2.48	.12	307	.27[f]	.01

[a]DR = Dorset x Rambouillet; RAMB = Rambouillet; ROM = Romanov x Dorset-Rambouillet.

[b]HCW =Weight (lbs) of lamb carcass; [c]REA = Average area (in square inches) of the right and left ribeye (longissimus) muscle ; [d]ADJFAT =Fat thickness (inches) at the 12th rib.

[e,f]Means within a column in a subgroup with different superscripts differ (P<.05).

[*]P<.05, [**]P<.01, [***]P<.001.

Table 3. Least squares means and standard errors for dressing percentage (DP)[b], leg conformation (LEG)[c], flank fat streakings (FFS)[d] and conformation (CONF)[e]

	DP			LEG			FFS			CONF		
Source of variation[a]	n	LSMeans	SE	n	LSMeans	SE	n	LSMeans	SE	n	LSMeans	SE
Ewe breeds												

DR	216	53.29	4.35	223	13.05	.53	222	11.96	.18	223	11.93	.14
RAMB	171	49.38	4.66	177	12.82	.63	177	11.91	.20	177	11.95	.15
ROM	203	49.90	4.58	205	13.03	.60	204	11.80	.19	205	11.81	.15
Sex of lamb												
female	307	50.02	4.50	315	12.77	.55	315	11.91	.18	315	11.89	.14
male	283	51.70	5.54	290	13.17	.55	288	11.87	.19	290	11.90	.14
Type of birth												
single	294	52.14	2.85	298	12.80	.54	296	12.03	.12	298	11.72	.09
multiple	296	49.57	8.22	307	13.13	.57	307	11.74	.34	307	12.07	.26

[a]DR = Dorset x Rambouillet; RAMB = Rambouillet; ROM = Romanov x Dorset-Rambouillet.

[b]DP = Dressing Percentage; [c]LEG = measured as Prime^{+} = 15, Average Prime = 14, Prime^{-} = 13, Choice^{+} = 12, Average Choice = 11, Choice^{-} = 10 ; [d]FFS = measured as Prime^{+} = 15, Average Prime = 14, Prime^{-} = 13, Choice^{+} = 12, Average Choice = 11, Choice^{-} = 10; [e]CONF = measured as Prime^{+} = 15, Average Prime = 14, Prime^{-} = 13, Choice^{+} = 12, Average Choice = 11, Choice^{-} = 10.

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