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Effect of Breed of Sire, Level of Postweaning Nutrition and Type of Birth
on Ewe Growth and Lambing Performance at 12, 24 and 36 Months of Age

A Progress Report

D. G. Levis and A. L. Slyter

There is a great need for sheep to be produced economically if they are going to survive the competition from other farm and ranch enterprises. Sheep production costs have increased dramatically over the last several years. These increased costs consume a higher percentage of the producer's dollar especially if the sheepman does not increase the overall efficiency of his sheep operation. One potential area to increase efficiency of sheep production is through an increase in the reproductive efficiency of the ewe. The practice of breeding ewes as lambs and thereby getting an additional lamb crop during a ewe's lifetime offers one possibility to increase the lifetime production of the ewe.

A research project was designed and initiated in the fall of 1970 to evaluate the effect of breed of sire, level of pre- and postweaning nutrition, age at first breeding and type of birth on subsequent reproductive performance of the ewe. The growth of the ewe, wool production and lambing performance data of the ewes at 12, 24, and 36 months of age will be reported in this paper.

Experimental Procedure

Initially 250 straightbred Targhee ewes were purchased and are currently maintained at the Antelope Range Field Station for this study. Each year one-half of these ewes are mated to Targhee and one-half to Suffolk rams to produce straightbred and crossbred lambs. These ewes are exposed for 35 days with the lambs born in late February and March. One-half of these lambs have access to creep feed on the range until weaned at an average age of 70 to 80 days. Postweaning they are randomly assigned within previous treatment and type of birth groups to a high or moderate energy level and fed in drylot for approximately 100 days on a 60% cracked corn, 40% ground alfalfa hay ration. The moderate energy level group is hand-fed what they will eat, up to 2.5 lb. per head per day, and receive 3 lb. per head per day the last 30 days. The high energy group is self-fed. These two levels were designed to approximately supply the N.R.C. requirements for replacement ewe lambs vs. fattening lambs. The ration was fed in ground form in 1971 and 1973 and as a pellet in 1972. Following the feeding period, they are allotted within previous treatment groups to be exposed to rams at 7 or 19 months of age. Two-thirds of the lambs are exposed for 34 days at 7 months of age and one-third are exposed for the first time when they are approximately 19 months of age. Finn crossbred ram lambs were used during the 1971 and 1973 breeding season and Columbia ram lambs during the 1972 season. Following this first breeding season all groups are combined and managed as a single flock with the following exception. Those

ewes lambing at 12 months of age receive supplemental grain prior to and following lambing. All ewes lambing at 12 months of age are lambed at the University Sheep Unit. Ewes lambing at 12 months of age nurse their lambs for approximately 60 days before the lambs are weaned. During the first week in June all ewes are sold under a research contract to a cooperative producer in northwestern South Dakota who supplies the University with subsequent lifetime production data.

Only significant main effects in at least 1 year of production of the ewes are included in tables 2 through 5. Interactions of main effects, whether significant or nonsignificant, are not included in this report.

Results and Discussion

Growth of Ewe

Data pertaining to the growth of the ewes born in 1971, 1972 and 1973 are presented in table 1. There was a significant difference between years for all four factors studied. Ewe lambs born as singles were heavier at birth than twin born lambs. This difference was still evident at weaning time of the first lamb crop for ewes bred at 7 months of age. Breed of sire had a significant effect on all four factors studied. Suffolk crossbred lambs were heavier than straightbred Targhee lambs. Creep feeding of lambs in this experiment was not beneficial. As can be seen in table 1, the noncreep fed lambs were significantly heavier than the creep fed lambs at weaning. This difference is believed to be due to the fact that creep consumption was extremely low and, in an effort to force the lambs to consume more of the creep feed, the ewes were confined to a smaller grazing area. There were no significant differences in ewe weight between the creep and noncreep fed ewes at 7 months prebreeding or when the ewes were weighed at approximately 14 months of age. Postweaning treatment of the ewes had a significant effect on the weight of the ewes. The higher level of nutrition produced a heavier ewe at 7 months prebreeding time and at weaning of the first lamb crop. When the ewes were 7 months old, there was a 10 lb. difference in weight between the high and moderate postweaning groups. However, the difference in weight at weaning of the first lamb crop was only 3.26 pounds. This would indicate, when given opportunity, ewe lambs developed on the moderate level of nutrition are able to compensate in part during the first winter.

Lambing Performance

Percent of ewes lambing at 12, 24 and 36 months of age is presented in table 2. Type of birth of ewe was not significant on percent of ewes lambing, but it does appear that a slightly higher percentage of ewes born as twins lambed at 12, 24 and 36 months of age than ewes born as singles. Breed of ewe was the only factor that had a significant effect on the number of ewes lambing. When the ewes were 12 months old, 75% of the crossbred ewes lambed as compared to 54% of the straightbred ewes. Crossbred ewes at 24 and 36 months of age have a small advantage for the number of ewes lambing when compared to the straightbred ewes.

Lamb date of birth, number of lambs born per ewe exposed and number of lambs born per ewe lambing is presented in table 3. The significant difference between years of birth of the ewes for lamb date of birth is not a valid year comparison due to differences in environment and management. Date of lambing was not significantly different between the crossbred and straightbred ewes at 12 and 24 months

of age. There was a significant difference for breed of ewe at 36 months of age. Crossbred ewes lambed approximately 15 days earlier than the straightbred ewes, which means that the crossbred ewes conceived earlier in the breeding season.

There was no significant difference between years in the number of lambs born per ewe exposed for the ewes lambing at 12 months of age. There was a highly significant difference (0.71 vs. 1.41 lambs) between years at 24 months in the number of lambs born per ewe exposed. Fifty-nine percent of the 1971 ewes were open at lambing in 1973, whereas only 5% of the 1972 ewes were open at lambing in 1974. This difference is probably due to management and environment. The number of lambs born per ewe lambing was significantly different between years for the ewes at 24 months of age. Ewes born in 1971 had an average of 1.12 lambs born, whereas the ewes born in 1972 had an average of 1.47 lambs born. A portion of this difference can be attributed to a difference in environment between years. Breed of ewe had a significant effect on the number of lambs born per ewe exposed when the ewes were 12 and 24 months old. The straightbred ewes averaged 0.61 lambs born as compared to an average of 1.02 lambs born for the crossbred ewes at 12 months of age. When the ewes were 24 months old, the crossbred ewes still produced more lambs than the straightbred ewes (1.15 vs. 0.97 lambs). Although not significant, it appears that at 36 months the crossbred ewe produces more lambs than the straightbred ewe (1.07 vs. 0.86 lambs). The breed of ewe only had a significant effect on the number of lambs born per ewe lambing when the ewes were 12 months old. The crossbred ewes produced 1.36 lambs and the straightbred ewes produced 1.13 lambs. Ewe age at first breeding had a highly significant effect on the number of lambs born per ewe exposed for lambing at 24 months of age. Ewes bred for the first time at 7 months averaged 1.16 lambs born, while ewes exposed at 7 months of age but not lambing to that exposure averaged 0.83 lambs born at 24 months of age. Ewes bred for the first time at 19 months of age averaged 1.20 lambs born. This indicates that those ewes not conceiving at 7 months had a low conception rate at 19 months of age. The number of lambs born per ewe exposed at 36 months of age for the ewes bred first at 7 months, 19 months and 7 months but open was 0.81, 0.87 and 1.20, respectively. Age at first breeding did not have a significant effect on the number of lambs born per ewe lambing at 24 or 36 months of age.

Table 4 presents data for the number of lambs weaned per ewe exposed, number of lambs weaned per ewe lambing and lamb weaning weight for the ewes at 12, 24 and 36 months of age. There was no difference between years for the number of lambs weaned per ewe exposed when the ewes were 12 months old. When comparing the number of lambs born per ewe exposed (table 3) with the number of lambs weaned per ewe exposed (table 4) at 12 months of age, it is found that the number of lambs lost from the 1971, 1972 and 1973 ewes was 0.28, 0.24 and 0.27 lambs, respectively. The significant difference between years at 24 months in the number of lambs born per ewe exposed is carried over to the number of lambs weaned per ewe exposed. The 1971 ewes weaned 0.53 lambs and the 1972 ewes weaned 0.86 lambs. The number of lambs lost from birth to weaning for the 1971 and 1972 ewes was 0.18 and 0.55 lambs, respectively. Breed of ewe had a significant effect on the number of lambs weaned per ewe exposed at 12 months of age. The crossbred ewe weaned 0.71 lambs and the straightbred ewe weaned 0.41 lambs. The crossbred ewes at 12 months of age lost 0.27 lambs from birth to weaning and the straightbred ewes lost 0.20 lambs from birth to weaning. Although not significant it appears that, when the ewes are 24 and 36 months old, crossbred ewes wean more lambs than straightbred ewes. Breed of ewe had a significant ($P < .05$) effect on the number of lambs weaned per ewe

lambing when the ewes were 12 months old. Crossbred ewes weaned 0.93 lambs and the straightbred ewes weaned 0.72 lambs. Postweaning treatment had a significant effect on the number of lambs weaned per ewe lambing when the ewes were 12 months old. Ewes which received the high energy level postweaning weaned 0.93 lambs and ewes receiving the moderate energy ration postweaning weaned 0.72 lambs.

Crossbred ewes consistently produced heavier lambs at weaning than did straightbred ewes. There was a difference in lamb weaning weight of approximately 6 lb. for the ewes at 12, 24 and 36 months. Type of birth of lamb had a significant effect on lamb weaning weight when the ewes were 12 and 24 months old. Single born lambs were consistently heavier than twin born lambs. However, when the ewes were 36 months old, there was no difference in lamb weaning weight due to type of lamb birth. This indicates that as the ewes mature they are more capable of raising twins.

Data for total pounds of lamb weaned per ewe lambing for the ewes at 12, 24 and 36 months of age are presented in table 5. In all three age groups the crossbred ewes produced more total pounds of lamb than did the straightbred ewes. Ewes that gave birth to twin lambs produced more total pounds of lamb than did the ewes giving birth to single lambs.

Wool Production

Straightbred ewes produced more wool than the crossbred ewes at 12 and 24 months of age (table 5). However, crossbred ewes produced more wool at 36 months of age than straightbred ewes. Ewes born as singles produced more wool at 12 ($P < .01$) and 36 ($P < .05$) months of age than the ewes born as twins. At 24 months of age type of birth of the ewe did not affect pounds of wool produced. Ewes receiving a high energy ration at postweaning produced more wool at 12 months of age than those ewes receiving a moderate energy ration. There was no difference in wool weight between the high and moderate energy ration for the ewes at 24 or 36 months of age.

Additional production data will be reported as it becomes available on this study.

Table 1. Least Squares Means for Ewe Birth Weight, Ewe Weaning Weight, Ewe Weaning Weight, Ewe Weight at 7 Months Prebreeding and Ewe Weight at Weaning of the 7 Month Lamb Crop

Variable	Ewe birth weight lb.	Ewe weaning weight lb.	Ewe weight at 7 months prebreeding lb.	Ewe weight at weaning of 7 month lamb crop lb.
Year of birth of ewe				
1971	10.09 ^a	49.15 ^a	90.86 ^a	90.80 ^a
1972	10.87 ^b	68.92 ^b	108.16 ^b	119.13 ^b
1973	10.81 ^b	56.03 ^c	114.16 ^c	111.58 ^c
Type of birth				
Single	11.54 ^a	64.45 ^a	109.09 ^a	111.28 ^a
Twin	9.64 ^b	51.62 ^b	98.80 ^b	103.06 ^b
Breed of ewe				
Targhee x Targhee	10.22 ^a	55.71 ^a	99.62 ^a	104.35 ^a
Suffolk x Targhee	10.96 ^b	60.36 ^b	109.17 ^b	109.99 ^b
Preweaning treatment				
Creep	---	56.56 ^a	104.02	107.68
Noncreep	---	59.50 ^b	104.77	106.66
Postweaning treatment				
High	---	---	109.33 ^a	108.80
Moderate	---	---	99.46 ^b	105.54

a,b,c Means within each variable in the same column with different superscripts differ significantly, P≤.01.

Table 2. Percent of Ewes Lambing at 12, 24 and 36 Months of Age

Item	Age of ewe		
	12 months	24 months	36 months
Year of birth of ewes			
1971	60	63	--
1972	57	95	--
1973	77	--	--
Type of birth of ewes			
Single	63	79	69
Twins	66	83	78
Breed of ewe			
Targhee x Targhee	54 ^a	77	69
Suffolk x Targhee	75 ^b	85	76
Preweaning treatment			
Creep	63	80	73
Noncreep	67	82	73
Postweaning treatment			
High	66	77	76
Moderate	63	84	70
Age at first breeding			
Bred at 7 months	--	--	66
Bred at 19 months	--	--	67
Exposed at 7 months, open	--	--	95

a,b Means within age of ewe with different superscripts differ significantly, P≤.01.

Table 3. Least Squares Means for Lamb Date of Birth, Number of Lambs Born per Ewe Exposed and Number of Lambs Born per Ewe Lambing by Age of Ewe

Item	Age of ewe		
	12 months	24 months	36 months
Lamb date of birth (days after January 1)			
Year of birth of ewes			
1971	83.47 ^a	112.27 ^a	---
1972	69.07 ^b	67.27 ^b	---
1973	73.37 ^b	---	---
Breed of ewe			
Targhee x Targhee	76.52	90.14	104.04 ^a
Suffolk x Targhee	74.09	89.40	89.05 ^b
Preweaning treatment			
Creep	74.07	90.45	96.92
Noncreep	73.36	89.08	96.16
Number of lambs born per ewe exposed			
Year of birth of ewes			
1971	0.71	0.71 ^a	---
1972	0.82	1.41 ^b	---
1973	0.92	---	---
Breed of ewe			
Targhee x Targhee	0.61 ^a	0.97	0.86
Suffolk x Targhee	1.02 ^b	1.15	1.07
Age at first breeding			
Bred at 7 months	---	1.16 ^a	0.81
Bred at 19 months	---	1.20 ^b	0.87
Exposed at 7 months, open	---	0.83 ^c	1.20
Number of lambs born per ewe lambing			
Year of birth of ewes			
1971	1.14	1.12 ^a	---
1972	1.36	1.47 ^b	---
1973	1.22	---	---
Breed of ewe			
Targhee x Targhee	1.13 ^a	1.28	1.31
Suffolk x Targhee	1.36 ^b	1.31	1.38
Age at first breeding			
Bred at 7 months	---	1.34	1.44
Bred at 19 months	---	1.33	1.29
Exposed at 7 months, open	---	1.21	1.31

a,b,c Means within age of ewe with different superscripts differ significantly, P≤.01.

Table 4. Least Squares Means for Number of Lambs Weaned per Ewe Exposed, Number of Lambs Weaned per Ewe Lambing and Lamb Weaning Weight by Age of Ewe

Item	Age of ewe		
	12 months	24 months	36 months
Number of lambs weaned per ewe exposed			
Year of birth of ewe			
1971	0.43	0.53 ^a	---
1972	0.58	0.86 ^b	---
1973	0.65	---	---
Breed of ewe			
Targhee x Targhee	0.41 ^a	0.59	0.67
Suffolk x Targhee	0.71 ^b	0.80	0.77
Age at first breeding			
Bred at 7 months	---	0.78 ^a	0.59
Bred at 19 months	---	0.79 ^b	0.62
Exposed at 7 months, open	---	0.51 ^c	0.94
Number of lambs weaned per ewe lambing			
Breed of ewe			
Targhee x Targhee	0.72	0.77	1.06
Suffolk x Targhee	0.93	0.91	1.16
Postweaning treatment			
High	0.93	0.82	1.09
Moderate	0.72	0.86	1.13
Lamb weaning weight, lb.			
Year of birth of ewe			
1971	36.43	58.81 ^a	---
1972	34.74	80.06 ^b	---
1973	37.94	---	---
Breed of ewe			
Targhee x Targhee	31.06 ^a	66.45	66.26
Suffolk x Targhee	37.03 ^b	72.42	72.53
Preweaning treatment			
Creep	35.78	67.61	61.21 ^a
Noncreep	32.31	71.25	77.79 ^b
Type birth of lamb			
Single	37.94 ^a	76.76 ^a	69.58
Twins	30.15 ^b	62.11 ^b	69.21

a,b,c Means within age of ewe with different superscripts differ significantly, P≤.01.

Table 5. Least Squares Means for Total Pounds of Lamb Weaned and Wool Weight by Age of Ewe

Item	Age of ewe		
	12 months	24 months	36 months
Total pounds of lamb weaned per ewe lambing			
Breed of ewe			
Targhee x Targhee	31.55 ^a	78.41 ^a	96.27
Suffolk x Targhee	45.03 ^b	94.33 ^b	101.70
Type of birth of lambs			
Single	38.03	78.00	77.51 ^a
Twins	38.55	94.74	120.45 ^b
Wool weight, lb.			
Year of birth of ewes			
1971	7.91 ^a	8.89 ^a	---
1972	6.85 ^b	10.84 ^b	---
1973	7.33 ^c	---	---
Breed of ewe			
Targhee x Targhee	7.71 ^a	10.43 ^a	7.28
Suffolk x Targhee	7.00 ^b	9.30 ^b	9.15
Type of birth of ewe			
Single	7.57 ^a	9.84	8.79
Twins	7.15 ^b	9.88	7.63
Age at first breeding			
Bred at 7 months	6.82 ^a	9.72 ^a	7.12
Bred at 19 months	8.39 ^b	9.40 ^b	8.19
Exposed at 7 months, open	6.87 ^c	10.46 ^c	9.33
Postweaning treatment			
High	7.55 ^a	9.85	8.56
Moderate	7.17 ^b	9.87	7.86

a,b,c Means within age of ewe with different superscripts differ significantly, P≤.01.