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Comparison of Reproductive Performance of Crossbred Ewes Bred for Either Fall or Spring Lambing at Two Different Locations: Progress Report

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Summary

The use of a separate fall lambing group is feasible for spreading lamb production out through the year, especially with the use of mature animals. If each lambing group is uniquely identified, the two groups could be commingled for much of the year to make best use of feed resources. The lambing groups only need to be separate at breeding and lambing time, making management less complicated. Lambing facilities, which are traditionally only used once per year, will be utilized twice annually, spreading overhead costs out over the two groups.

Lambs born to the fall lambing group can be ready to market in the early spring when prices are generally highest and young lamb supplies are lowest. Marketing new crop lambs at this time makes the supply of lamb more continuous and provides quality lamb to consumers throughout the year.

Fall lambing performance has not been as successful in the range system as in the farm system. Nutrition is probably the main factor for this difference. Ewes in the range fall flock were turned out to winter pasture after weaning their lambs in December. Feed sources at this time of year were of a lower quality and/or quantity than those supplied to the farm fall group.

Key Words: Ewe, Out of Season Lambing, Reproductive Performance

Introduction

One of the goals of any sheep operation is to optimize the use of facilities and labor while spreading costs over as many marketable lambs as possible. To accomplish this, shortened interval lambing systems have been introduced that will increase the number of lambings to 1.3 or 1.5 opportunities per year in an effort to increase the pounds of lambs weaned per ewe exposed per year. One disadvantage to many of these systems is the large amount of time and labor needed in order to make these operations work successfully.

Breeding ewes in the spring after a short postpartum interval results in a less fertile mating than spring breeding after a long postpartum interval (Lewis, 1996). In order to improve fertility further in the spring breeding season, selection for fertile ewes in the spring is necessary. Al-Shorepy and Notter (1996) demonstrated that the heritability for fertility in fall lambing groups was higher than those reported for spring lambing groups. They went on to conclude that selection to improve fertility may be more effective in spring breeding than in fall breeding. Litter size in the fall was found to be favorably correlated to spring fertility, making this trait a useful selection criterion to improve spring fertility (Al-Shorepy and Notter, 1996).

An alternative to short interval lambing is to divide the flock into two lambing groups—one to lamb in the fall and one to lamb in the spring. In this system, ewes only lamb once per year, but the pattern of lamb production is spread out to provide a more continuous supply of lamb to the market. Since lambing occurs at the same calendar dates each year, management is less complicated and less labor intensive than short interval systems. The use of equipment, facilities, and labor as well as costs and risk are spread out over more of the year. When lambs are produced and marketed throughout the year, wide price variations are

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minimized. Fall lambing offers a means to accomplish this. Selecting for fertility in the fall lambing group should improve the success of this system. The objective of the current study was to measure the performance of crossbred ewes lambing in the fall compared to similar ewes lambing in the spring at two different locations.

Experimental Procedures

Finn-Dorset x Targhee (FDT) F_1 (n=524) and Hampshire x FDT (n=80) ewe lambs produced at the Antelope Range Livestock Station (Buffalo, SD) in 1992, 1993, and 1994 are the base flock of this study. These April-born ewe lambs were weaned in August-September and transported to the Brookings Station where they were grown out and exposed at approximately 12 months of age for September lambing. Each year the pregnant ewes from this initial exposure were randomly assigned to either the range or farm flock fall lambing group. The remaining open ewes were randomly split between the four lambing groups to balance the numbers per group, i.e., approximately 50 ewes entering the fall and spring groups in the range and farm flock systems each year. Subsequent replacement ewes were selected from multiple births from early lambing ewes and remained with their birth group starting with the fall 1994 born group of lambs (fall born ewe lambs remain with the fall group and spring born ewe lambs remain with the spring group). Rams were selected from the fall lambing groups at both locations and were used as yearlings for one year (both fall and spring) at their respective locations. Rams were replaced annually and the ewes were turned over as rapidly as possible while maintaining base flock numbers. The spring group served as the control.

The spring farm flock ewes were exposed starting approximately September 20 at Brookings and the spring range flock ewes starting approximately November 15 at the Antelope Range Livestock Station. Ewes in both fall flocks were exposed beginning approximately April 15.

Common practices to all groups included the use of teaser rams for 15 days prior to exposure to fertile rams, flushing, a 35-day breeding season, and routine vaccinations. Ewes remained with their lambing group unless they missed two consecutive lambings, had any serious unsoundness that impaired performance (i.e. lameness, bad udders, prolapse), death, or were replaced with younger ewes. After the flock size was established, ewe turnover was as rapid as possible with approximately one-third of the ewes being replaced each year. Each flock was maintained at approximately 150 head at each lambing opportunity.

At lambing, number of lambs born (live and dead), lamb sex, and individual lamb weights were recorded. Ewes were allowed to raise no more than two lambs. Extra lambs were either grafted onto another ewe or were sold as bottle lambs if no graft dam was available. In both spring flocks, all male lambs were castrated, while in the fall flocks 10 to 12 male lambs were left intact as possible ram replacements. Lamb weights at weaning were adjusted to a common 75 days of age. Other data collected were numbers of ewes exposed, lambing, and weaning a lamb. Prebreeding weights and condition scores of ewes as well as ewe weights at weaning were also recorded. Fleece weights were recorded at shearing. Percentage of ewes lambing, percentage of ewes weaning a lamb, lambs born and weaned per ewe exposed and per ewe lambing, and all weights were analyzed using least squares procedures of SAS (1996). Data from all years (1993 to 1996) were pooled together by age of ewe. Age of ewe at lambing was nested within flock group and defined as the number of years since birth when lambing occurred. Initial ewes lambed for the first time at the age of 18 months in the fall and 24 months in the spring. Replacement ewe lambs in the farm systems (spring and fall) lambed for the first time at approximately 12 to 13 months of age, while first lambing occurred at 24 months of age in both range flocks. Comparisons were made between similar ages within location or season such that range spring 2-year-olds were compared to range fall 2-year-olds and to farm spring 2-year-olds, etc. Comparisons were also made between different ages of ewes within the same flock group.

Results

Table 1 shows the mean ewe weight and body condition score (prebreeding), ewe weight at weaning for ewes weaning a lamb(s), weight change prebreeding to weaning for lactating ewes, and fleece weight. Body weight increased with age

Table 1. Ewe weights and condition scores at breeding and weaning and fleece weights by age of ewe

Flock group	Age	Prebreeding Wt (lb)	Prebreeding Score[a]	Ewe weight at weaning (lb)[b]	Ewe weight change (lb)[c]	Fleece weight (lb)
Range						
Fall	1	142.0	3.03	135.3	-12.6	6.73
	2	117.1	2.37	148.5	not available	6.11
	3	148.1	2.78	not available	not available	8.17
	4	145.5	2.75	not available	not available	6.60
Spring	2	143.7	3.10	136.7	-2.6	5.87
	3	155.1	2.58	152.4	-7.3	7.57
	4	164.0	2.56	155.4	-10.4	7.68
Farm						
Fall	1	140.9	3.13	137.7	-7.1	7.31
	2	163.5	2.21	170.8	6.8	9.46
	3	179.4	2.35	180.9	-2.3	9.74
	4	181.6	2.02	182.0	-0.1	8.47
Spring	1	115.4	3.09	122.5	5.9	5.93
	2	145.7	2.86	148.8	3.3	4.82
	3	166.5	2.83	154.3	-10.9	8.31
	4	179.3	3.09	169.0	-11.0	8.56

[a]Five point scale 1 = extremely thin, 5 = extremely fat.
[b]Ewe weight at weaning only for ewes that raised and weaned at least one lamb.
[c]Weight change measured from prebreeding to weaning for ewes weaning a lamb(s).

at both prebreeding and weaning with the exception of the range fall 2-year-olds. This lower value (117.1 lb) may be explained in part by failure to obtain prebreeding weights on all 2-year-old ewes. Two-year-olds failed to get weighed in the spring of 1994 and 1995 in the range system. Condition scores at prebreeding remained fairly constant across the different ages even though the maiden ewes carried more condition than the other age groups. As expected most ewes lost weight during lactation but were able to recover the weight loss by the next breeding period.

Lambing performance by age is presented in Table 2. The percentage of ewes lambing and weaning a lamb improved with age in the farm fall group. In the range spring group, the percentage of ewes lambing and weaning a lamb improved between age 2 and 3 but dropped slightly at age 4. An improvement with age was also found in the range fall group after age 2; the number of yearlings that lambed was influenced by these ewes being bred at Brookings and transported to the Antelope Range Station. In general, the spring groups performed better than the fall groups and the farm flocks were superior to the range flocks.

Table 2. Lambing performance by age of ewe

Flock group	Age	Percentage of ewes lambing	Lambs born per ewe lambing	Lambs weaned per ewe lambing	Percentage of ewes weaning a lamb	Lambs born per ewe exposed	Lambs weaned per ewe exposed
Range							
Fall	1	74.4	1.22	1.14	71.2	.91	.81
	2	10.3	1.44	1.29	9.7	.15	.13
	3	16.4	1.56	1.56	16.3	.25	.25
	4	50.0	1.50	1.50	50.0	.75	.75
Spring	2	85.9	1.79	1.57	75.8	1.54	1.19
	3	94.2	1.86	1.65	90.7	1.76	1.51
	4	90.6	2.03	1.67	84.4	1.84	1.41
Farm							
Fall	1	66.1	1.22	1.13	56.2	.81	.64
	2	68.8	1.37	1.30	65.3	.95	.85
	3	85.7	1.55	1.50	77.1	1.33	1.16
	4	100.0	1.88	1.73	88.0	1.88	1.52
Spring	1	94.0	1.19	1.14	84.0	1.12	.96
	2	92.8	1.99	1.79	89.6	1.85	1.60
	3	87.8	2.10	1.79	86.0	1.83	1.54
	4	97.1	2.32	1.78	91.4	2.26	1.63

For example, only 16.4% of the range fall 3-year-olds lambed compared to 94.2% of the range spring 3-year-olds and 85.7% of the farm fall 3-year-olds. It is interesting to note that at 4 years of age 97.1% of the farm spring and 100.0% of the farm fall ewes lambed. The prolificacy of these ewes is indicated by the number of lambs born per ewe lambing. It can be seen that between locations prolificacy of ewes of the same age is similar, although the fall ewes gave birth to fewer lambs than the spring ewes, generally. The number of lambs born per ewe exposed combines the conception rate of the ewes (indicated by the percentage of ewes lambing) and the prolificacy of the ewes. This explains the low values for the fall flocks when viewed on a per ewe exposed basis. The decrease in number of lambs per ewe at weaning from lambing is due to lamb losses including stillbirths, lamb death, and bottle lambs sold, so it is not completely indicative of the mothering ability of the ewes, as management factors influence number of lambs weaned.

Litter weight per ewe lambing and per ewe exposed are shown in Table 3. Again, the per ewe exposed basis demonstrates the effect of open ewes on production. In all groups, the litter weight at lambing improved with age. When comparing ewes of the same age between the two systems, litter birth weight per ewe lambing was similar but at weaning the farm system showed a clear advantage. There was an advantage in adjusted weaning weight for the spring groups at both locations. However, this advantage was more pronounced in the range system. The adjusted 75-day litter weight at weaning on a per ewe

Table 3. Litter weights (lb) per ewe exposed and per ewe lambing by age

Flock group	Age	Litter wt born/ewe lambing	Litter wt born/ewe exposed	Adj. 75-day litter wt weaned/ewe lambing[a]	Adj. 75-day litter wt weaned/ewe exposed[a]
Range					
Fall	1	10.89	8.09	51.4	36.5
	2	12.07	1.24	55.1	5.3
	3	13.93	1.84	61.9	10.1
	4	18.00	6.00	57.5	28.8
Spring	2	15.86	13.62	86.4	65.5
	3	17.34	16.33	83.4	75.6
	4	18.73	17.98	79.8	67.3
Farm					
Fall	1	10.94	7.05	64.7	36.3
	2	13.62	9.29	76.9	50.2
	3	14.66	12.54	89.8	69.3
	4	18.25	18.25	101.5	89.3
Spring	1	12.97	12.17	65.0	54.6
	2	20.16	18.71	101.3	90.8
	3	21.23	18.51	105.1	90.3
	4	23.37	22.70	100.6	91.9

[a]Weaning weights unadjusted for lamb sex.

lambing basis did not follow similar trends among groups. The range fall group peaked with 3-year-olds, while these weights decreased with the range spring ewes. In the farm system, both groups had improved adjusted weights such that fall yearlings and 4-year-olds had similar adjusted weaning weights to their respective contemporaries in the spring group, but the 2- and 3-year-olds in the spring weaned more pounds of lamb than those in the fall.

From these results, it can be seen that the use of a separate fall lambing group did spread lamb production out over more of the year, although the performance of the fall group was less than that of the spring group with the exception of mature farm flock ewes. Additional work needs to be conducted on lifetime production and longevity for fall lambing ewes.

Literature Cited

Al-Shorepy, S. A., and D. R. Notter. 1996. Genetic variation and covariation for ewe reproduction, lamb growth, and lamb scrotal circumference in a fall-lambing sheep flock. J. Anim. Sci.. 74:1490-1498.

Lewis, R. M., D. R. Notter, D. E. Hogue, and B. H. Magee. 1996. Ewe fertility in the STAR accelerated lambing system. J. Anim., Sci.. 74:1511-1522.

SAS. 1988/96. SAS/STAT User's Guide (Release 6.11). SAS Inst., Inc., Cary, NC.