lb/24 hr, respectively. This suggests that the part Finn ewes are better able to rear twin lambs when managed as in this experiment. The differences between breeds for ewes rearing single lambs were small at 40 days of lactation.

At 70 days of lactation ewes of all breeds had similar milk production. Milk consumption for lambs which have been creep fed is low enough at 70 days so that no major setback for the lambs results when they are weaned at 70 days.

Table 3. Total milk consumption by single and twin progeny of ewes at approximately 40 and 70 days of lactation (lb/24 hr).

	1/4F, 1/4D, 1/2R		1/4F, 1/2D, 1/4R		1/2D, 1/2R	
	40	70	40	70	40	70
Single	2.38	1.44	2.35	1.58	2.56	1.67
Twin	3.40	1.81	2.95	1.74	2.26	1.86
Average	2.89	1.63	2.65	1.66	2.41	1.77
Overall average	2.26		2.16		2.09	

Summer Lambing Performance of Crossbred Ewes of Finnsheep, Dorset and Rambouillet Breeding when Mated in January to Purebred or Crossbred Rams

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Story in Brief

Reproductive performance of five, six and seven-year-old crossbred ewes representing six combinations of Finnsheep (F), Dorset (D), Rambouillet (R) and White Face Western (WFW) breeding were evaluated when lambing in the summer (June, 1978). The six breed combinations represented were 3/8F, 5/8WFW; 1/4F, 1/2D, 1/4R; 1/4F, 1/4D, 1/2R; 1/4F, 3/4R; 1/2D, 1/2R and 1/4D, 3/4R. Breeding effectiveness of purebred and crossbred rams of Hampshire and Suffolk breeding was also compared when mated to these ewes.

Results of the summer lambing were quite favorable with the entire flock averaging 1.62 lambs born per ewe exposed. Ewes of 3/8-Finnsheep breeding showed a lambing rate of 2.26 compared to 1.87 for ewes of 1/4-Finnsheep breeding and 1.65 for ewes of only Dorset-Rambouillet breeding. At least 85.7 percent fertility was recorded for each of the crossbred ewes.

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Reproductive performance of ewes when mated to either purebred or crossbred rams in January- February was virtually the same whether measured by fertility, lambs born per ewe lambing or lambs born per ewe exposed. These results are in contrast to previous findings involving three years of May-June matings. For May-June, 1977 matings, these same ewes when mated to crossbred rams gave birth to an average of 33 more lambs per 100 ewes exposed than those ewes mated to purebred rams.

Introduction

The basic aim of commercial sheep producers is to increase the efficiency of lamb meat production and this can be achieved by increasing the reproductive rate. Two desirable ways of increasing reproductive rate are (1) infusion of germ plasm of more prolific breeds into commercial flocks and (2) adoption of some type of accelerated lambing program to shorten interval between lambings.

The commercial sheep industry of Oklahoma and the Southwest has been built around Rambouillet ewes which are relatively long-lived and shear heavy fleeces but are slow maturing and not very prolific. Past research at the Oklahoma Agricultural Experiment Station has shown that crossbred ewes of Dorset x Rambouillet breeding are more productive under Oklahoma farm flock conditions. Broadening the genetic base of ewe flocks by the introduction from Finland of the Finnish Landrace (Finnsheep) noted for its superior lambing rate, is a possible method of improving the productivity of the commercial sheep of the Southwest.

A program of lambing every eight months (accelerated lambing) may be feasible because ewes have a five-month gestation peroid. Research at this station has shown that ewes of Dorset-Rambouillet breeding produce desirable lamb crops when lambing in the fall, winter or spring and early in the summer.

The purpose of this paper is to report the reproductive performance of five, six and seven-year-old crossbred ewes of Dorset and Rambouillet breeding with similar ewes containing 1/4 and 3/8 Finnsheep breeding when lambing in the summer of 1978. Some data on the breeding effectiveness of purebred and crossbred rams when mated to these same ewes is also included.

Materials and Methods

Approximately 250 crossbred ewes of six combinations of Finnsheep (F), Dorset (D), Rambouillet (R) and White Face Western (WFW) (a group that are predominantly Rambouillet) breeding were produced at the Southwestern Livestock and Forage Research Station (Ft. Reno), El Reno, Oklahoma, during the winter and spring months of 1971, 1972 and 1973. The six breed combinations represented were 3/8F, 5/8WFW; 1/4F, 1/2D, 1/4R; 1/4F, 1/4D, 1/2R; 1/4F, 3/4R; 1/2D, 1/2R and 1/4D, 3/4R. Reproductive performance of some of these ewes when lambing in the winter of 1972, 1973, 1974 and 1977; the fall of 1974, 1975 and 1977; and the summer of 1976 has been reported previously in the Animal Science and Industry Research Reports of 1974-1978.

Ewes nursed their lambs for approximately 70 days after each lambing, except that ewes that lambed late had their lambs weaned at younger ages because of the next breeding season. Condition scores and weights were taken on the ewes each time before breeding and lambing. Scores range from one to nine with a score of one indicating a very thin ewe and a score of nine indicating a very fat ewe.

Prior to January 5, 1978, ewes were divided into single sire breeding groups of 30 to 32 each for breeding which resulted in summer 1978 lambing. Breeding groups were equalized as closely as possible for number of ewes of each crossbred group and for number of ewes rearing zero, one or multiple lambs the previous lambing. A Hampshire, Suffolk, Hampshire x Suffolk or Suffolk x Hampshire sire was placed with each

breeding group from January 5 to February 24, 1978. Rams used were about 2-years-old.

Lambing started on May 30, 1978, and continued through June. Ewes lambed under close supervision in a barn or adjacent pasture. After the lambs were about a week old, both ewes and lambs had access to sweet sudan and pearl millet pasture and alfalfa pasture. Dry weather forced the feeding of supplemental ground alfalfa and corn at approximately 3 lb per head per day towards the end of the summer. Lambs had access to creep feed during the preweaning period. The lambs were weaned from their dams at approximately 70 days of age with the exception of late born lambs weaned four to five days before ewes were to be bred for the next lambing.

Results and Discussion

Ewe Reproductive Performance

Lambing performance of the six crossbred ewe groups when lambing in the summer of 1978 are presented in Table 1. For comparison purposes, the lambing performance for the summer of 1976 (previously reported in the 1977 Animal Science Research Report) and the lambing performance in the fall of 1977, when a generally poor lamb crop was obtained (also, previously reported in the 1978 Animal Science Research Report) are presented in the table. Comparisons, therefore, will be discussed between summer 1978 and 1976 lambings, and summer 1978 and fall 1977 lambing.

A flock average of 1.62 lambs born per ewe exposed for summer, 1978, is a slight improvement over the summer of 1976 record of 1.54 lambs born per ewe exposed. The slight improvement of summer 1978 lambing over summer 1976 lambing might be because ewes had a very poor performance in the fall of 1977. Therefore, most of those ewes that did not lamb in the fall of 1977, mated early in January, 1978 and lambed in the summer of 1978. Summer 1978 lambing records indicated 56 single births, 148 sets of twins and 16 sets of triplets. Twenty-six out of the 252 ewes exposed to the rams did not lamb.

Fertility, as measured by percent of ewes lambing, did not differ much for the summer of 1978 and that of 1976. However, three breed groups in the summer of 1976 (3/8F, 5/8WFW; 1/4F, 1/2D, 1/4R and 1/4F, 3/4R) had 100 percent fertility. At least 85.7 percent fertility was recorded in either or the two summer seasons. On the average, summer 1976 fertility was better than summer 1978 fertility (96.2 percent vs 89.7 percent). Fall 1977 average fertility was very poor (38.5 percent) with a high of 51.6 percent for 1/2D, 1/2R ewes.

In the summer of 1978, ewes of 3/8-Finnsheep breeding showed a superior lambing rate (lambs born per ewe lambing) of 2.26 compared to 1.87 for ewes of 1/4-Finnsheep breeding and 1.65 for ewes of only Dorset-Rambouillet breeding. For summer 1976, lambing rates were as follows: 1.96, 1.65 and 1.46, respectively, for 3/8-Finnsheep ewes, 1/4-Finnsheep ewes and Dorset-Rambouillet ewes. In the fall of 1977, lambing rate was 1.38 each for the same ewe groups demonstrating the usual lower lambing rate associated with fall lambing. On the average, lambs born per ewe lambing was higher for summer 1978 (1.81) than summer 1976 (1.60) and was low (1.38) for the fall of 1977.

Lambs born per ewe exposed is an overall measure of reproductive performance and a combination of both fertility and lambing rate. In the summer of 1978, lambs born per ewe exposed for 3/8-Finnsheep ewes, 1/4-Finnsheep ewes and Dorset-Rambouillet ewes were 2.17, 1.68 and 1.45, respectively. For the summer of 1976, the same measures of reproductive performance for the three breed groups were 1.96, 1.61 and 1.38, respectively. During the fall of 1977, the three breed groups produced .46, .45 and .63 lambs per ewe exposed, respectively. It should be noted that for the two summer seasons, 3/8-Finnsheep ewes were superior to 1/4-Finnsheep ewes and 1/4-Finnsheep ewes were in turn superior to ewes of Dorset-Rambouillet breeding. While in

Table 1. Lambing performance of the six crossbred ewe groups when lambing in the summer of 1976, fall of 1977 and summer of 1978.

	3/8F, 5/8WFW	1/4F, 1/2D, 1/4R	1/4F, 1/4D, 1/2R	1/4F 3/4R	1/2D, 1/2R	1/4D, 3/4R	Total
a) Summer 1976 lambing results							
No. available	24	40	47	33	61	56	261
No. lambing	24	40	44	33	58	52	251
% lambing	100.0	100.0	93.6	100.0	95.1	92.9	96.2
Lambs born	47	65	77	51	87	74	401
Lambs/ewe lambing	1.96	1.62	1.75	1.55	1.50	1.42	1.60
Lambs/ewe exposed	1.96	1.62	1.64	1.55	1.43	1.32	1.54
b) Fall 1977 lambing results							
No. available	24	39	47	33	62	52	257
No. lambing	8	13	14	12	32	20	99
% lambing	33.3	33.3	29.8	36.4	51.6	38.5	38.5
Lambs born	11	17	21	16	43	29	137
Lambs/ewe lambing	1.38	1.31	1.50	1.33	1.34	1.45	1.38
Lambs/ewe exposed	.46	.44	.45	.48	.69	.56	.53
c) Summer 1978 lambing results							
No. available	24	35	45	31	68	49	252
No. lambing	23	30	40	30	59	44	226
% lambing	95.8	85.7	88.9	96.8	86.8	89.8	89.7
Lambs born	52	59	75	53	102	68	409
Lambs/ewe lambing	2.26	1.97	1.88	1.77	1.73	1.55	1.81
Lambs/ewe exposed	2.17	1.69	1.67	1.71	1.50	1.39	1.62

Table 2. Lambing performance of the crossbred ewes when mated to purebred and crossbred rams of Hampshire and Suffolk breeding during January-February 1976, May-June 1977 and January-February 1978.

	January-February, 1976		May-June, 1977		January-February, 1978	
	Purebred	Crossbred	Purebred	Crossbred	Purebred	Crossbred
Rams, no.	4	4	4	4	4	4
Ewes exposed, no.	131	130	129	128	126	126
Ewes lambing, no.	127	124	32	67	114	112
Ewes lambing, %	96.9	95.4	24.8	52.3	90.5	88.9
Lambs born, no.	203	198	41	96	205	204
Lambs/ewe lambing	1.60	1.60	1.28	1.43	1.80	1.82
Lambs/ewe exposed	1.55	1.52	.32	.75	1.63	1.62

the fall season, even though reproductive performance was poor with 38.5 percent of ewes lambing, the ewes of only Dorset-Rambouillet breeding were superior to both 3/8- and 1/4-Finnsheep ewes.

All fall lambing results previously reported in Animal Science Research Reports of 1974 and 1975 followed a similar pattern to that shown in Table 1b with ewes of only Dorset-Rambouillet breeding being more fertile than those of part Finnsheep breeding. Considering both summer lambing seasons, 3/8F, 5/8WFW excelled in lambs born per ewe exposed and 1/4D, 3/4R ewes producing fewer lambs.

In all three seasons shown in Table 1 and considering only ewes of Dorset-Rambouillet breeding, the 1/2D, 1/2R ewes outperformed 1/4D, 3/4R ewes in reproductive performance (1.43 vs 1.32) for summer 1976 (.69 vs .56) for fall 1977 and (1.50 vs 1.39) for summer 1978. This is as expected based on how ewes of similar breeding have performed in the past.

Purebred vs Crossbred Rams

Table 2 shows the lambing performance of the ewes when mated to either purebred or crossbred rams in January-February 1976, May-June 1977 and January-February 1978. Winter 1976 and late spring 1977 mating results have been reported previously in Animal Science Research Reports for 1977 and 1978, respectively. They are presented again for comparison with winter 1978 results.

In 1976 and 1978 winter breeding seasons, reproductive performance of ewes mated to purebred or crossbred rams was virtually the same whether measured by fertility (96.9 percent and 95.4 percent vs 90.5 percent and 88.9 percent), lambs born per ewe lambing (1.60 and 1.60 vs 1.80 and 1.82) or lambs born per ewe exposed (1.55 and 1.52 vs 1.63 and 1.62). In the late spring breeding season in 1977, crossbred rams did substantially better than purebreds in fertility (52.3 percent vs 24.8 percent), lambs born per ewe lambing (1.43 vs 1.28) and in lambs born per ewe exposed (.75 vs .32).

In the 1976 Animal Science and Industry Research Report, it was reported that when these same ewes lambed in the fall of 1974 and 1975, ewes mated to crossbred rams gave birth to an average of 19 more lambs per 100 ewes exposed than ewes mated to purebred rams. In 1977 May-June mating, the advantage was 33 more lambs per 100 ewes exposed. The rams tested were approximately 16-months-old at the beginning of the 1974, 1975 and 1977 matings. For the January-February matings of 1976 and 1978, rams tested were approximately 24-months-old.

Since the winter breeding and late spring breeding results do not agree, a possible explanation would be that a high proportion of the ewes were sexually active in January-February in 1976 and 1978; therefore, there was little difference whether a pure-or crossbred ram was used. The fertility in May-June in 1974, 1975 and 1977 might suggest low sexual activity of ewes in these seasons and observations of the flock and mating records verify this fact. In May-June, 1977 matings, 25 ewes did not mate at all to purebred rams and 19 ewes did not mate at all to crossbred rams. Out of a total of 78 ewes that cycled a second time, 43 mated to purebred rams and 35 to crossbred rams. In May-June, 1975 matings, nine ewes did not mate at all to purebred rams and four did not mate at all to crossbred rams, but out of 135 ewes that cycled a second time 58 mated to purebred rams and 77 mated to crossbred rams. In a third cycle, 17 mated to purebred rams and 31 mated to crossbred rams. Two ewes mated in a fourth cycle to crossbred rams. These results suggest that crossbred rams are more agressive in the breeding pastures during the spring than purebred rams, thus the crossbred advantage. These and past results suggest the use of crossbred rams when mating in May-June.

Future Plans

Ewes have been bred in August-September, 1978 to lamb in January-February, 1979. The project will be terminated during the winter of 1979-80.