

Sheep

Breeding Performance of Purebred vs. Crossbred Hampshire and Suffolk Rams¹

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Story in Brief

A two year study comparing the breeding effectiveness of purebred Hampshire and Suffolk rams to crossbreds of the same two breeds has been completed. About 240 ewes of various combinations of Finnsheep (F), Dorset (D), and Rambouillet (R) of which 54% were $\frac{1}{4}$ Finnsheep were used each year in a May-June breeding program. Each year the ewes were divided into eight equal groups based on ewe breed and age and the number of lambs that each ewe had reared the previous season. Two Hampshires, two Suffolk and four crossbred (HxS and SxH) yearling rams were tested each year by randomly assigning each ram to one of the ewe groups for a test period of about 45 days.

In spite of considerable ram to ram variation the crossbred rams were much more effective in getting a higher percentage of their assigned ewes to lamb. The conception percentages for crossbred rams was 77 and 72% as compared to 60 and 58% for the purebred rams in 1974 and 1975, respectively. The lambing rate (lambs born per ewe lambing) was not greatly different for crossbred vs. purebred rams, although there appeared to be a small advantage for purebreds during the 1974 season. The lambs born per ewe exposed was 1.09 and 1.04 for crossbred rams and .92 and .83 for purebred rams during 1974 and 1975, respectively.

Introduction

There has been considerable research that has shown that when one crosses two adapted breeds of farm animals and selects females from the cross to use as breeding stock, the crossbred females are generally more productive than the average of the females of the breeds crossed. There is earlier sexual maturity by the crossbreds in addition to a higher conception rate and they produce more milk. There is some data suggesting that they live longer also. Because of this tendency for the crossbred females to be more productive than the average of the females from the breeds crossed, it is said that there is heterosis for female produc-

¹ In cooperation with USDA, Agricultural Research Service, Southern Region.

tivity. There has been very little research to evaluate whether crossbred males are more productive than purebreds. However, crossbred rams are held in high esteem by commercial sheepmen in some areas of the U.S. because experience has indicated that in some ways they are better than purebreds.

The purpose of this study was to compare the mating performance and breeding ability of purebred Hampshire and Suffolk rams to that of HxS and SxH crossbred rams under May-June breeding conditions.

Materials and Methods

During the summer of 1972 an agreement was reached with two sheep breeders, Clifford Sloan (Suffolk) and Clyde Bachtel (Hampshire) of Hamilton, Missouri, regarding the production of purebred and crossbred rams from common genetic stock. By exchanging females at breeding time, these breeders produced purebred Hampshire and Suffolk and reciprocal cross rams. The same ram that sired purebreds of either breed also sired some of the crossbreds.

Enough ram lambs of each kind to meet the needs of the project were purchased at about 4-5 months of age each year. (One or more spares of each kind were also obtained in order to guard against death losses, accidents, etc.) The rams were reared together, maintained in healthy condition and used first when at least 16 months of age. Just prior to their first use, semen samples were obtained by electro-ejaculation. Those rams of each kind judged to be most fertile were used in the breed comparison test. A new group of rams were purchased each year and tested the following year. The tests reported in this paper involved the set of rams born in January and February 1973 and tested in 1974 and those born in 1974 and used in 1975.

To evaluate the performance of the rams, the ewe flock was divided into eight equal groups. Since the ewes were of five different crossbred combinations of Finnsheep (F), Dorset (D), and Rambouillet (R), a careful allotment to groups was made to assure that each ram was exposed to the same number of ewes of each combination. In addition, the past reproductive performance of the ewes was also considered and balanced. The ewe combinations involved were $\frac{1}{4}$ F, $\frac{1}{2}$ D, $\frac{1}{4}$ R; $\frac{1}{4}$ F, $\frac{1}{4}$ D, $\frac{1}{2}$ R; $\frac{1}{4}$ F, $\frac{3}{4}$ R; $\frac{1}{2}$ D, $\frac{1}{2}$ R and $\frac{1}{4}$ D, $\frac{3}{4}$ R. Since the $\frac{1}{4}$ F groups have not mated and conceived very readily during the spring, these tests demonstrate to what extent the kind of ram used may influence the mating performance of ewes.

In the two years of the study, the breeding season began May 15 and continued for about 45 days. The rams were equipped with marking harnesses and the ewes were gathered each morning to record the

matings made during the previous 24 hours. This also permitted the replacement of any rams that were not performing. Since mating records are not a highly accurate record of actual matings, the evaluation of the rams used in this study was based on the lambing performance of the ewes to which the rams were mated.

Results and Discussion

The traits of greatest interest in this study concerned the ability of the various rams to get a high percentage of their assigned ewes to lamb, the lambing rate of those ewes, and the average lambing date. Tables 1 and 2 present the results for each individual ram during 1974 and 1975, respectively. Table 3 summarizes the comparison of the purebred rams' performance vs. that of the crossbred rams.

Percent Ewes Lambing

This is a very important trait and of great interest in this study because not much is known about the influence of the ram on the percent of the ewes in a flock that will conceive and lamb out of season.

In both tables 1 and 2 there is a lot of variation from ram to ram in the % ewes lambing. During each year only one of the four purebred rams produced a high percent ewes lambing and one crossbred ram in 1974 was not very effective. Said another way, in 1974 four rams were reasonably effective (74-93% ewes lambing) of which three were crossbreds. In 1975 of the five most effective rams (67-83% ewes lambing) four were crossbreds. From table 3 the overall effectiveness of the purebreds vs. crossbreds is large. Purebred rams succeeded in causing conceptions in 60 and 58% of their ewes in 1974 and 1975 while the crossbreds produced conceptions at the rates of 77 and 72%, respectively.

It is therefore apparent that with yearling blackfaced rams used first at 16-17 months of age and with a May and June breeding season to ewes, some of which do not conceive readily out of season, the benefits of using crossbred rams instead of purebred rams is quite large when considering the percent of the ewes that conceive for October-November lambing. The benefit may not be as large if one compares older rams or if the breeding season were at another time. The data do strongly suggest that the rams may have a large effect on the percent of the ewes that conceive and the crossbred rams are more effective for some reason.

Lambing Rate

The number of lambs born per ewe lambing is essentially a measure of twinning rate since there are very few triplets born. Tables 1 and 2 again show a considerable amount of ram to ram variation. On the average, the Suffolk rams produced the fewest twins even though one ram

Table 1. The lambing performance of crossbred ewes¹ mated to purebred and crossbred Hampshire and Suffolk rams during May and June 1974.

Item	Suffolk		Hampshire		SxH		HxS	
	B2	B3	B22	B23	B41	B45	B44	B46
Ewes exposed, no.	31	30	30	29	31	30	31	29
Ewes lambing, no.	23	16	18	15	23	28	25	17
Ewes lambing, %	74	53	60	52	74	93	81	59
Lambs born, no.	37	21	28	24	34	36	38	24
Lambs/ewe lambing.	1.61	1.31	1.56	1.60	1.48	1.29	1.52	1.41
Lambs/ewe exposed.	1.19	0.70	0.93	0.83	1.10	1.20	1.23	0.83
Lambing date, av. ²	300	303	296	301	299	309 ³	301	300

¹ Ewes were various combinations of Finnsheep, Dorset and Rambouillet.

² Day of the year.

³ Ram B45 was placed with ewes about 10 days later than other rams as a replacement for a ram that would not breed.

Table 2. The lambing performance of crossbred ewes¹ mated to purebred and crossbred Hampshire and Suffolk rams during May and June 1975.

Item	Suffolk		Hampshire		SxH		HxS	
	B6	B7	B26	B27	B54	B50	B52	B53
Ewes exposed, no.	31	30	31	29	30	29	30	30
Ewes lambing, no.	18	15	23	14	21	24	21	20
Ewes lambing, %	58	50	74	52	70	83	70	67
Lambs born, no.	24	21	34	22	31	35	30	28
Lambs/ewe lambing.	1.33	1.40	1.48	1.57	1.48	1.46	1.43	1.40
Lambs/ewe exposed.	0.77	0.70	1.10	0.76	1.03	1.21	1.00	0.93
Lambing date, av.	305	302	301	298	295	300	300	301

¹ Ewes were various combinations of Finnsheep, Dorset and Rambouillet.

Table 3. A comparison of the breeding effectiveness of purebred Hampshire and Suffolk rams to that of their crossbred (HxS and SxH) half brothers in 1974 and 1975.

Item	1974		1975	
	Purebred	Crossbred	Purebred	Crossbred
Ewes exposed, no.	120	121	121	119
Ewes lambing, no.	72	93	70	86
Ewes lambing, %	60	77	58	72
Lambs born, no.	110	132	101	124
Lambs, ewe lambing.	1.53	1.42	1.44	1.44
Lambs, ewe exposed.	.92	1.09	.83	1.04

produced one of the highest twinning rates. The crossbred rams were reasonably uniform and produced an intermediate number of twins. The Hampshire rams on the average produced the highest number of twins. Comparing the purebreds to the crossbreds, the purebreds showed a small advantage over the crossbreds in 1974 and there was no difference in number of twins in 1975. The small overall difference between purebreds and crossbreds could easily be due to chance.

Lambs Born Per Ewe Exposed

This measure combines percent ewes lambing and lambing rate and in these tables measures the productivity of each ram. Since there were very large differences in the ability of the rams to get a high percent of their ewes to conceive, that variation is reflected in the values for this trait. Consequently, the crossbred rams excelled as compared to the purebreds. The .92 and .83 lambs born per ewe exposed for purebreds as compared to 1.09 and 1.04 for the crossbreds in 1974 and 1975, respectively, suggests considerable economic advantage to the use of crossbred rams under these conditions.

The relatively low values for percent ewes lambing and lambs born per ewe exposed require an explanation. The ewe flock to which these rams were mated is composed of 46% crossbreds of Dorset and Rambouillet ancestry and 80% of these ewes have conceived. The other 54% of the ewes are $\frac{1}{4}$ F Finnish Landrace (Finnsheep). Only 62% of these ewes have conceived to May and June breeding.

Lambing Date

This trait is a measure of how fast the ewes conceive after the rams are turned in. The values given in tables 1 and 2 are fairly similar except for one ram that was put in late in 1974. There does not seem to be any particular pattern to the lambing dates insofar as the purebred vs. crossbred sires are concerned.