

The  $\frac{1}{4}D\frac{3}{4}R$  and  $\frac{1}{4}F\frac{3}{4}R$  ewes produced the heaviest grease fleeces, the  $\frac{1}{4}F\frac{1}{4}D\frac{1}{2}R$  and  $\frac{1}{2}D\frac{1}{2}R$  ewes produced the next heaviest fleeces and the  $\frac{1}{4}F\frac{1}{2}D\frac{1}{4}R$  ewes produced the lightest fleeces. These findings are a reflection of the fact that Rambouillets produce heavier fleeces than either Dorsets or Finnsheep.

Fleece grades followed a similar pattern with the fleeces from the  $\frac{1}{4}D\frac{3}{4}R$  and  $\frac{1}{4}F\frac{3}{4}R$  averaging slightly lower than "Half Blood". The fleeces from the  $\frac{1}{4}F\frac{1}{4}D\frac{1}{2}R$  and  $\frac{1}{2}D\frac{1}{2}R$  ewes averaged about "Three-Eighths Blood" and the average grade of the fleeces from the  $\frac{1}{4}F\frac{1}{2}D\frac{1}{4}R$  ewes was intermediate between "Three-Eighths" and "Quarter Blood".

These data would indicate that the substitution of a  $\frac{1}{4}$  Finnsheep breeding for  $\frac{1}{4}$  Dorset breeding in these crossbred ewes has little effect on grease fleece weight or grade.

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## Comparisons of Some Reproductive Traits of Dorset, Suffolk and Hampshire Rams Under Commercial Conditions

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### Story in Brief

In order to get some information about breed of sire effects on certain reproductive traits, the records of the Ft. Reno flock for a 10 year period were studied. During this period 27 Dorset and 28 Blackfaced (about half were Suffolk and half Hampshire) rams were involved in 2501 matings and 2141 lambings. For certain comparisons the Blackfaced rams were compared to the Dorsets and for other studies the breed effects were studied by breed.

When the breeding season was during the spring, the Dorset rams were more aggressive whereas the Blackfaced rams were more aggressive during the late summer and fall. There was little difference due to ram breed in conception rate. When Dorset X Western crossbred ewes were mated to Blackfaced rams, they produced and reared nine more lambs per 100 ewes lambing than when mated to Dorset rams. Blackfaced rams

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sired more lambs that were born dead or died during lambing. Dorset sired lambs were about one-half pound lighter at birth and were more often born unassisted. Hampshire sired lambs were more often assisted and more often scored weak at birth.

Some of these breed differences were so small that other more important characteristics might well be the basis for deciding which breed of sire to use under specific conditions.

## Introduction

Sheepmen seldom use enough rams of different breeds at one time or maintain the kind of records necessary to adequately evaluate the performance of rams of different breeds. Also, there is a great deal of variation between the performances of rams of the same breed. As a consequence of these conditions and others, there is a lack of information about the comparative performance of rams of the commonly used breeds.

The experimental flock at the Ft. Reno Livestock Research Station near El Reno has been managed under conditions similar to commercial production and has produced the kind of records that will permit certain kinds of breed comparisons relative to ram performance. The purpose of this paper is to summarize those results that are thought to be unbiased and of significance to sheepmen.

## Materials and Methods

During the period 1960 through 1970 several breeding studies were underway with the flock. The mating plan involved comparing ewe breed and crossbred groups. The different mating pens were made up to contain equal representations of the different breeds and ages of ewes. The rams used were Dorsets, Suffolks or Hampshires. To each ewe pen one Dorset and one Blackfaced ram were assigned and each ram had an equal opportunity to make matings and sire lambs. The ewes in each pen were a mixture of Westerns (mostly Rambouillets) and Dorset X Western crossbreds in about equal proportions.

The rams of all breeds were commercial quality individuals with no special efforts made to select for or against any particular characteristics. Semen samples were collected by electroejaculation before the breeding season and only males with satisfactory semen were used. Marking harnesses and observations were also sources of information relative to ram performance. The records of rams that sired less than six lambs were not used.

During this period the mating seasons were sometimes during late May-June (spring) or during August-September or October-November (late summer and fall). During the mating season the two rams assigned to a mating pen were rotated daily if 25-35 ewes were involved or both rams were put in if pens contained larger numbers. During the periods of most rapid mating the rams were with the ewes from about 5:00 p.m. until 8:00 a.m. daily and were fed and rested during the day. Mating marks were recorded each morning to monitor the mating behavior of both rams and ewes.

Lambing was under rather close observation and ewes with difficulty were given assistance. Lambing records included birth weight of lamb(s), birth difficulty, lamb vigor and lamb livability. Also, at lambing the face color of the lamb indicated which of the rams sired the lamb.

During the period of the study, there were 55 different rams (27 Dorsets and 28 Blackfaces) used. The Dorset rams produced 98 ram season records. The 28 Blackfaced rams produced 99 ram seasons. The average age of rams used was almost identical indicating that the survival rate was similar and ram age did not effect the results.

## Results

Because of the management of the flock during the years involved, it is felt that only certain of the possible comparisons are unbiased and produced dependable conclusions. Consequently, the results will be presented in that manner. The comparison of the Dorset to the Blackfaced rams is adequate for mating behavior, conception rate, lambing rate, lamb vigor and survival and lambing ease. The Hampshire and Suffolk sires can be compared only for lambing rate and difficulty and lamb vigor and survival.

Table 1 indicates that there were 2,368 ewe mating records that could be used in the study with 880 made during the fall and 1,488 made during

Table 1. The Number of Ewe Matings Recorded by Season and by Breed of Ram Making the First Mating.

| Breeding season | No. of matings <sup>1</sup> | Breeding of ram |           |
|-----------------|-----------------------------|-----------------|-----------|
|                 |                             | Dorset          | Blackface |
| Fall            | 880                         | 377             | 503       |
| Spring          | 1488                        | 792             | 696       |
| Total           | 2368                        | 1169            | 1199      |

<sup>1</sup> An additional 133 ewe matings resulted in twin born lambs with one lamb sired by the Dorset ram and one sired by the Blackfaced ram.

the spring. With the Dorset and Blackfaced rams given an equal opportunity to make the first mating, the Blackfaced rams made the first mating about 57 percent of the time under fall breeding conditions. This would suggest that the Blackfaced rams were more aggressive during the fall. On the other hand, under spring breeding conditions the Dorset rams made the first mating over 53 percent of the time and were more aggressive. Over all, the two kinds of rams were similar, but there does seem to be a seasonal difference in aggressiveness with Dorset rams excelling in the spring and Blackfaced rams excelling during the fall.

Table 2 presents the conception rate to the first mating for the two kinds of rams during the two seasons. Conception rate during the fall appears to be only slightly higher than during the spring. Likewise, conception rate to matings to Blackfaced rams appears to be slightly higher than to Dorsets. These differences are so small, however, that they could easily be due to chance and represent no real difference.

Table 3 presents the results that attempt to determine the advantage of mating Dorset X Western (DC) ewes to Blackfaced rams to produce triple cross (B X DC) lambs as compared to mating the same ewes to Dorset rams to produce backcross (D X DC) lambs.

In considering this comparison, it is important to remember that different mating plans were involved. When mated to Western ewes, both kinds of sires produced singlecross lambs that are thought to contain the normal amount of heterosis (hybrid vigor) for such traits as vigor and survival. When the two kinds of rams mated with the Dorset X Western crossbred ewes, the lambs from Dorset rams were backcross lambs while the lambs from the Blackfaced rams were triplecross lambs. It is expected that triplecross and singlecross lambs have heterosis in equal amounts while backcross lambs have only one-half as much. If there is heterosis for

Table 2. Numbers and Percentages of Ewes Conceiving to the First Mating for Each Breeding Season.

| First Mating By | Breeding Season | Number Available | Number Conceived | Percent Conceived |
|-----------------|-----------------|------------------|------------------|-------------------|
| Dorset rams     | Spring          | 792              | 662              | 83.82             |
| Dorset rams     | Fall            | 377              | 332              | 85.41             |
|                 |                 | 1169             | 985              | 84.30             |
| Blackface rams  | Spring          | 696              | 591              | 84.91             |
| Blackface rams  | Fall            | 503              | 432              | 85.88             |
|                 |                 | 1199             | 1023             | 85.30             |

Table 3. Measures of Reproductive Performances of Dorset vs. Black-faced Rams When Mated to Two Kinds of Ewes.

| Measure                     | Kind of Mating |       |        |        | Triplecross <sup>1</sup><br>Advantage |
|-----------------------------|----------------|-------|--------|--------|---------------------------------------|
|                             | D X W          | B X W | D X DC | B X DC |                                       |
| No. ewes lambing            | 592            | 621   | 567    | 588    |                                       |
| Conc. to 1st Mating (%)     | 84.7           | 87.2  | 83.8   | 83.3   | — 3.0                                 |
| Lambing rate <sup>2</sup>   | 140.0          | 139.3 | 148.8  | 153.1  | 5.0                                   |
| Lamb mortality <sup>3</sup> | 7.1            | 9.9   | 7.9    | 7.4    | — 3.3                                 |
| Lambs reared <sup>4</sup>   | 130.1          | 125.4 | 137.0  | 141.7  | 9.4                                   |

<sup>1</sup> This compares triple cross (B X DC) to back cross (D X DC) using the single crosses (D X W and B X W) to correct for ram differences.

<sup>2</sup> Lambing rate is number of lambs born per 100 ewes conceiving to each kind of mating.

<sup>3</sup> Lamb mortality is lambs born dead or dying prior to two weeks of age as percent of total lambs born.

<sup>4</sup> Lambs reared is number of lambs alive at two weeks of age per 100 ewes lambing.

embryo survival and lamb liveability, we would expect to raise more lambs when Dorset X Western ewes conceive to Blackfaced rams than when they conceive to Dorset rams. The left two columns show the conception rates, lambing rates, % lamb mortality and lamb rearing rates when both Dorset and Blackfaced rams were mated to western ewes. There were slightly more lamb deaths from Blackfaced rams resulting in less lambs reared. The third and fourth columns give the results when the same rams were mated to Dorset X Western ewes. When comparing these values, we must realize that differences may be due to breed differences in the rams or to the difference in the heterosis of the lambs.

The last column is the difference in columns three and four adjusted by the differences shown in columns one and two. The -3.0 percent difference in conception to first mating in favor of the backcross mating could easily have been due to chance. The fact that it favors the backcross mating does not suggest any heterosis for the trait. The value of 5 more lambs born for triplecross than backcross matings results from a few more multiple births. This might be due to heterosis for embryo liveability. The difference in lamb mortality appears to be real, but is peculiar in that it suggests that these Blackfaced rams when mated to Western ewes produced lambs with a higher mortality than the Dorsets, but the higher mortality did not exist in matings with the crossbred ewes. The advantage of 9.4 lambs in lambs reared results from more lambs being born with a greater livability in Blackface by Dorset cross matings as compared to the backcross matings. This suggests that if sheepmen with Dorset X Western crossbred ewes will mate them to Blackfaced rams, they can expect to raise more lambs than if they are mated back to Dorset sires. Our best estimate of the advantage is about nine lambs per 100 ewes lambing.

If this 9.4 extra lambs reared per 100 ewes conceiving to this type of

mating is an estimate of one-half of the heterosis involved in embryo and lamb livability, then the data suggest that heterosis could account for about 18 more lambs reared from crossbred matings as compared to straightbred matings. In any case, it strongly suggests the need for producing crossbred lambs when possible in commercial production.

Table 4 compares the three actual breeds of rams for these traits with the results averaged across the two kinds of ewes. It is first important to realize that there were no large differences found between the breeds of rams for these traits. Our experience indicates that the ram to ram variation within any one of these breeds is much greater than the average difference between breeds.

It is worth noting, however, that the Suffolks produced a few more multiple births than the other breeds, but if lambs surviving is the criteria of interest, the Dorset rams had a slight lead. This was partially due to less Dorset sired lambs that were born dead or died during birth. There were also less Dorset sired lambs that required assistance at birth. The latter would be expected because Dorset sired lambs average about one-half pounds less at birth than the Blackface sired lambs. According to our classification of vigor at birth, the Suffolk and Dorset sired lambs averaged a little higher than the Hampshire sired lambs, a few more of which had to be pulled.

## Discussion

The traits considered in this study are important, but not the only traits concerned when deciding which breed of ram one should buy for commercial production. The fact that the breeds considered were so similar for the traits involved in this study suggests that it might be well to make major decisions on the basis of other traits.

**Table 4. Comparison of Ram Breeds for Traits Involving Reproduction, Lambing Difficulty and Lamb Vigor.**

| Trait                               | Breed of Sire |           |        |
|-------------------------------------|---------------|-----------|--------|
|                                     | Suffolk       | Hampshire | Dorset |
| No. of ewes lambing                 | 514           | 498       | 1159   |
| Lambing rate <sup>1</sup>           | 147           | 144       | 144    |
| Rearing rate <sup>1</sup>           | 132           | 130       | 133    |
| Lambs born dead (%) <sup>2</sup>    | 4.3           | 3.9       | 2.4    |
| Lambs born unassisted (%)           | 88            | 85        | 91     |
| Lambs strong/birth <sup>3</sup> (%) | 82            | 77        | 81     |

<sup>1</sup> Per 100 ewes lambing.

<sup>2</sup> Born dead or died during birth.

<sup>3</sup> A score given all newborn lambs.

Our past and continuing research results suggest that if sheepmen are going to save some of their ewe lambs for replacements and if they plan to lamb during the fall and early winter, the ram breed of choice is Dorset. Many years experience with hundreds of ewes indicate that the Dorset X Western crossbred ewe produces and raises more fall or early winter born lambs than any other breed or cross. Suffolk X Western ewes work satisfactorily for January-February lambing. If lambing during the spring, a crossbred ewe of any two productive breeds would be expected to produce more lambs than straightbred ewes, especially if the latter were Rambouillets that do not produce a high percentage of multiple births.

If a sheepman has followed a good plan and most of his ewes are good crossbreds, he should use rams of an unrelated breed that sire fast growing lambs with good carcasses. Although not included in this study, other studies from the Ft. Reno flock have shown that Blackfaced sires produce lambs that grow a little faster, especially after weaning at about 10 weeks of age, as compared to Dorset sired market lambs.

This study further emphasizes the fact that for commercial fall lambing conditions in Oklahoma, the most efficient use of breeds would involve mating Dorset rams to Rambouillet ewes to produce crossbred Dorset X Rambouillet ewe lambs to be kept for flock replacements. These crossbred ewes will be more productive than the Rambouillet ewes that produced them. This study suggests that the crossbred ewes will produce and raise more lambs if mated to Blackfaced (Hampshire or Suffolk) rams than if mated to Dorset rams.

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