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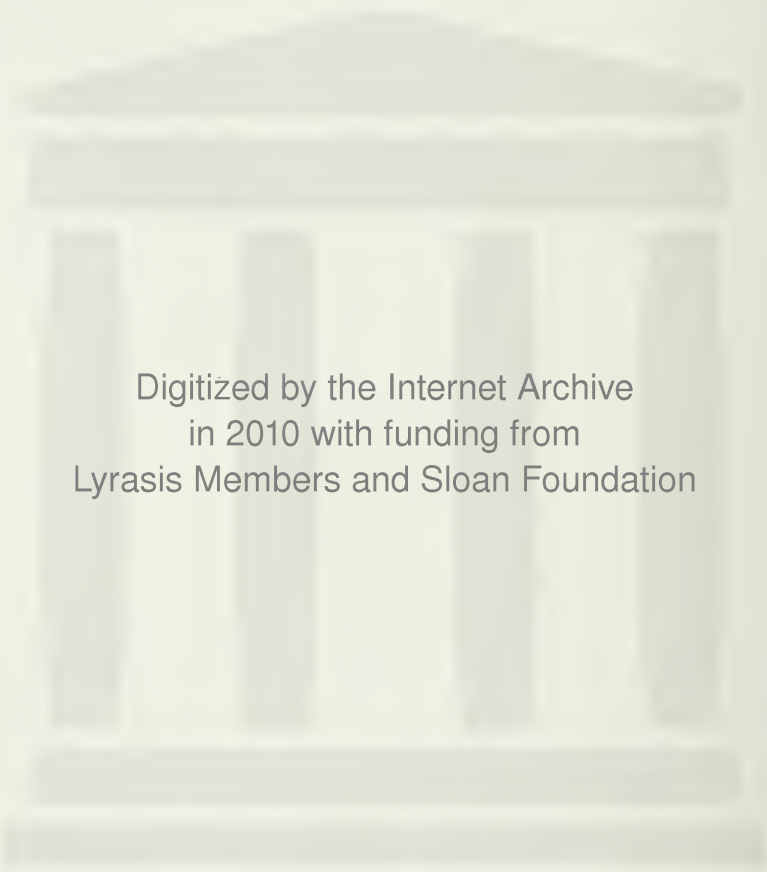
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Retained for Flock Replacement



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Breed As a Factor in the Production Of Ewes Retained for Flock Replacement

C. J. CUNNINGHAM, J. A. WELCH, and J. O. HEISHMAN

DURING THE DECADE from 1940 to 1950 large numbers of ewes for flock replacements were brought into West Virginia from the western part of the United States. These western ewes were larger and thriftier than the native ewes and proved to be more profitable, as indicated by a study by Livesay and Cunningham (1). As time passed good western ewes became more difficult to obtain and more expensive. The question arose as to how suitable flock replacements could best be obtained from the ewes purchased from the West.

The data presented in this bulletin were collected over a period of six years starting with the breeding season of 1954. The flock was kept at the Reymann Memorial Farms, a substation of the West Virginia University Agricultural Experiment Station, located at Wardensville.

Experimental Procedure

Ewes used in this study were the offspring of ewes purchased in California in 1951 as yearling lambs. The western ewes were of Hampshire X Rambouillet and Suffolk X Rambouillet breeding. They were divided into three equal groups and bred to Hampshire, Dorset, and Corriedale rams. As near as possible an equal number of the top ewe lambs from each mating were retained each year for flock replacement. Sufficient ewe lambs were kept to maintain the flock at its original number.

Ewe lambs were bred to a Southdown ram in the fall of their first year. Thereafter they were divided into different groups and bred to either Corriedale, Dorset, or Hampshire rams as indicated in Table 1. Data on the performance of ewes bred to Southdown rams is not included in this study.

Each year the different groups were pasture bred, allowing a two-month breeding season beginning in early September. After the breeding period the three groups of ewes were put together and treated as one flock. Lambs were born in a barn and were weighed and ear-tagged at birth and were docked and castrated when one to two weeks old. All lambs were creep-fed a grain mixture consisting of 50 per cent cracked corn and 50 per cent whole oats by weight.

TABLE 1
BREEDING PATTERN FOLLOWED

Breed of Ewe's Sire	Year					
	1954	1955	1956	1957	1958	1959
Corriedale	C.	D.	H., D.	D.	D., H.	D., H.
Hampshire	H.	H.	H., D.	H.	D., H.	D., H.
Dorset	D.	D.	D.	D., H.	D., H.	D., H.
Hampshire + Hampshire grandsire	H., D.	H.	D., H.	D., H.
Dorset + Dorset grandsire	D.	D.	D., H.	D., H.

C. = Corriedale.
D. = Dorset.
H. = Hampshire.

Parasite control measures consisted of feeding free choice a mixture of one part phenothiazine and nine parts salt. In addition, each ewe received 25 grams of phenothiazine before going to pasture and again in the fall about two weeks before breeding. When necessary all sheep were sprayed to control external parasites.

Lambs were marketed each year in two drafts. Just before marketing the lambs were graded by a committee consisting of a University staff member, a Reymann Memorial Farms staff member, and an "official" lamb grader employed by the West Virginia Livestock Marketing Association. Federal standards for grading of slaughter lambs were used. The lambs were graded to the nearest whole grade and each grade was assigned a numerical value. Values assigned during 1955 through 1958 were: prime and choice grades—1; good—2; medium—3; plain—4; and cull—5. In 1959 and 1960 prime and choice were separated so that the value ranged from 1 (prime) to 6 (cull). Each committee member scored each lamb individually and the average of the scores to the nearest grade was the lamb's final grade.

All data on lamb performance, lambing rates, lamb mortality, and wool weights were recorded on IBM cards. Analysis of variance was used to test for differences in performance traits of ewes and lambs due to breed of sire of the ewes. Effects (both main effects and interactions) of sex and type of birth or rearing on lamb performance were either separated out in the analysis of variance or, in the case of average daily gain, adjusted for prior to analysis, by the factors given in West Virginia

Station Bulletin 505 by Cunningham *et al.* (2). The lambs studied therein included the ewes studied here and their mates of similar breeding and other lambs born and raised side by side with the lambs studied here. Lambs that were raised as singles gained 0.07 lbs. more per day than lambs raised as twins, and wether lambs gained 0.03 lbs. more per day than ewes. Almost identical figures were reported earlier in Virginia Bulletin 492 (3).

The lack of two generations of Hampshire and Dorset breeding in the first two years of this study and the year-to-year change in breeding pattern prevented the efficient use of least squares analysis as a method of adjustment for sex, type, and year of birth as had been done in the studies reported in the two bulletins cited above.

In the cases of lambs born and raised, lamb mortality, and number of barren ewes, data for the three single-bred groups were pooled over the six years for analysis and data for all five breeding groups over the last four years were pooled for a separate analysis.

Results and Discussion

On the whole, differences between the five different breeding groups in lambing performance and in the productivity of their lambs were small and inconsistent from year to year during the six-year study. The comparisons drawn in 1954-55, when the ewes were bred to rams of their own breeds, and in 1958-59 and 1959-60, when all ewes were divided about equally among Dorset and Hampshire rams, are the most meaningful.

LAMB CROP

Differences due to breed of ewe in the number of lambs born and raised to weaning per ewe (Table 2) were not significant by either analysis (3 breed groups over 6 years; 5 groups over last 4 years). Corriedale-sired ewes dropped on the average 1.54 lambs per ewe bred and raised 1.37 per ewe to marketing. Hampshire-sired ewes gave birth to 1.38 lambs per ewe bred and raised 1.15 of these. The Dorset-sired ewes dropped 1.40 lambs per ewe and raised 1.27 to market age.

The double-bred Dorset and Hampshire ewes tended to bear and raise fewer lambs per ewe than did the single-bred ewes, but this trend was due in large part to the fact that these ewes were, on the whole, younger than the single-bred ewes during the period of this study.

MORTALITY

Differences in the percentage of lamb mortality (Table 3) from birth to weaning were not significant among the breeds of ewes studied.

TABLE 2
NUMBER OF LAMBS BORN^a AND RAISED^b PER EWES EXPOSED BY BREED AND YEAR

Year	Breed of Ewe's Sire														
	Corriedale			Hampshire			Dorset			Hampshire X			Dorset X		
	No. Ewes	Lambs Born	Lambs Raised	No. Ewes	Lambs Born	Lambs Raised	No. Ewes	Lambs Born	Lambs Raised	No. Ewes	Lambs Born	Lambs Raised	No. Ewes	Lambs Born	Lambs Raised
1955	9	1.78	1.67	12	1.58	1.42	7	1.71	1.57						
1956 ^c	19	0.89	0.84	21	1.00	0.81	19	0.74	0.68						
1957	24	1.38	1.17	29	1.31	1.03	26	1.19	1.00				3	1.67	1.67
1958	30	1.83	1.60	28	1.39	1.25	29	1.59	1.59	10	1.10	0.50	8	1.10	0.88
1959	34	1.65	1.47	32	1.69	1.31	36	1.64	1.44	17	1.24	1.00	12	1.24	1.25
1960	34	1.59	1.41	28	1.29	1.11	37	1.49	1.30	29	0.93	0.69	18	0.93	1.06
All Years	150	1.54	1.37	150	1.38	1.15	154	1.40	1.27	59	0.90	0.80	41	1.10	1.05

a and b—No significant differences among breed groups.

c—Poor performance due in large part to one infertile ram.



DORSET—SIREW EWES



CORRIEDALE—SIREW EWES



HAMPSHIRE—SIREW EWES

TABLE 3
PER CENT LAMB MORTALITY BY BREED AND YEAR^{b, c}

Year	Corriedale	Hampshire	Dorset	Hampshire X Hampshire	Dorset X Dorset
1955	6.2	10.5	8.3		
1956	5.8	19.0	7.1		
1957	15.1	21.0	16.1	0.0	25.0
1958	12.7	10.2	0.0	54.5	0.0
1959	10.7	22.2	11.8	23.5	0.0
1960	11.1	13.8	12.7	35.0	5.2
All Years	11.2(231) ^a	16.9(207)	9.7(217)	32.1(53)	4.4(45)

a—Number lambs born in parentheses.

b—No significant differences. Group D(1) tended to show less mortality than group H(2) ($P < 0.10$).

c—Percentages were transformed to angles for analysis.

(1) in footnote^b = Dorset.

(2) in footnote^b = Hampshire.

However, the lambs from both the single- and double-Dorset-sired ewes tended to show less mortality than the corresponding Hampshire groups ($P < 0.10$ in the case of single-bred).

The Dorset-sired ewes produced 217 lambs during the six years of this study, of which 196 reached market age, a mortality of 9.7 per cent, the lowest of the three single-bred groups of ewes studied. All the Dorset lambs dropped during one year (1958) reached market. Corriedale-sired ewes produced 231 lambs with 204 reaching market age, a mortality of 11.2 per cent, and Hampshire-sired ewes produced 207 lambs with 172 reaching market age, a mortality of 16.9 per cent. A trend toward higher mortality of lambs from Hampshire ewes was noted also in the earlier work of Livesay and Cunningham (1).

BIRTH WEIGHT

The mean birth weights for the lambs from the ewes sired by the different breeds for the six-year period were 9.0 lbs. for the Corriedale, 9.6 lbs. for the Hampshire, and 9.0 for the Dorset. The double-bred Hampshire ewes had lambs with an average birth weight of 8.7 lbs. and the double-bred-Dorset, 8.6 lbs.

Hampshire-sired ewes produced lambs that were heavier at birth ($P < 0.05$) than lambs from the Corriedale-sired ewes in three out of the six years and lambs that were heavier than those of the Dorset-sired ewes in two of the six years. The birth weights of lambs from the Hampshire-sired ewes were significantly heavier when compared to lambs from double-bred Hampshire ($P < 0.05$) and double-bred Dorset ($P < 0.01$)

TABLE 4

AVERAGE BIRTH WEIGHT BY BREED OF DAM'S SIRE AND YEAR¹

Year	Corriedale	Hampshire	Dorset	Hampshire X	Dorset X
				Hampshire	Dorset
1955 ^b	8.0(15) ^a	9.2(17)	8.2(11)		
1956 ^c	8.6(16)	10.4(17)	8.9(13)		
1957 ^d	9.6(28)	9.5(30)	9.3(26)	8.2(5)	8.4(3)
1958 ^e	8.8(48)	10.6(35)	9.0(46)	9.2(5)	8.6(7)
1959 ^d	9.1(52)	8.8(43)	8.8(52)	8.0(19)	8.5(15)
1960 ^d	9.1(48)	9.5(33)	9.3(50)	9.6(17)	8.7(18)

a—Number of lambs in parentheses.

b—H>C (P<0.05).

c—H>C and D (1) (P<0.05).

d—No significant differences.

e—H>C, D and DD(2) (P<0.01); H>HH(3) (P<0.05).

f—Differences due to sex and type of birth and interactions of these with breed were separated before testing for breed differences.

(1) D = Dorset.

(2) DD = Dorset X Dorset (double bred).

(3) HH = Hampshire X Hampshire (double bred).

ewes in one year (Table 4). Thus Hampshire-sired dams appear to provide a birth weight advantage to their lambs just as do Hampshire sires to their lambs, Carter *et al.* (3), and Cunningham *et al.* (2).

AVERAGE DAILY GAIN

The mean adjusted average daily gains (lbs.) of lambs from the ewes sired by the various breeds of rams in this study were: Corriedale, .59; Hampshire, .60; Dorset, .60; double-bred Hampshire, .58; and double-bred Dorset, .59. There were no significant differences in the performance of lambs from any of the breeds of ewes in the average daily gains in four of the six years of this study. However, in 1955 (Table 5) the Hampshire-sired ewes produced lambs that gained faster than the lambs from Corriedale-sired (P<0.01) ewes. Also in this same year, the lambs from the Dorset-sired ewes gained faster (P<0.05) than lambs from the Corriedale-sired ewes. In 1956, lambs produced by the Dorset-sired ewes gained faster (P<0.05) than the lambs from the Corriedale-sired ewes.

SLAUGHTER GRADE

There were only slight differences in grades of the lambs produced by the various breeds of ewes studied. No significant differences existed in four of the six years this work was in progress. However, in 1956 the Dorset-sired ewes produced lambs that graded significantly higher than the lambs from Corriedale-sired ewes at the 1 per cent level, and the lambs from the Hampshire ewes graded higher than the Corriedale at the

TABLE 5
ADJUSTED AVERAGE DAILY GAIN^e BY BREED OF DAM'S SIRE AND YEAR

Year	Corriedale	Hampshire	Dorset	Hampshire X Hampshire	Dorset X Dorset
1955 ^b	.59(15)	.67(17)	.64(11)		
1956 ^c	.62(16)	.66(17)	.69(13)		
1957 ^d	.59(28)	.60(30)	.61(26)	.57(5)	.61(3)
1958 ^d	.57(48)	.56(35)	.56(46)	.55(5)	.57(7)
1959 ^d	.61(52)	.58(43)	.60(52)	.59(19)	.61(15)
1960 ^d	.59(47)	.59(33)	.59(49)	.58(17)	.59(16)

a—Number of lambs in parentheses.

b—H>C (P<0.01); D>C (P<0.05).

c—D>C (P<0.05).

d—No significant differences.

e—Adjustment for sex and type of rearing was by factors given in Bulletin 505, Literature Cited (2).

TABLE 6
AVERAGE LAMB GRADE BY BREED OF DAM'S SIRE AND YEAR^d

Year	Corriedale	Hampshire	Dorset	Hampshire X Hampshire	Dorset X Dorset
1955 ^a	2.2	2.1	1.7		
1956 ^b	2.2	1.5	1.2		
1957 ^a	1.8	1.6	1.6	1.8	2.0
1958 ^a	2.2	2.0	2.0	1.8	1.9
1959 ^a	3.2	3.3	3.0	3.1	2.8
1960 ^c	3.6	3.3	3.3	3.0	3.6

a—No significant differences.

b—D graded higher than C (P<0.01); H graded higher than C (P<0.05).

c—HH graded higher than DD and C (P<0.05).

d—In testing for breed differences, differences due to sex and type of rearing and interactions of these with breed were separated first.

5 per cent level (Table 6). In 1960 the lambs from the double-bred Hampshires graded significantly higher than the lambs from the double-bred Dorset and the Corriedale-sired ewes at the 5 per cent level.

WOOL YIELD AND LONGEVITY

Ewes from Corriedale breeding produced more wool than the double-bred Hampshire (P<0.01) and the Dorset-sired (P<0.05) ewes (Table 7).

There were insufficient numbers of ewes born in any one year to test statistically for differences in longevity.

TABLE 7
WOOL YIELD AND LONGEVITY BY BREED

	Corriedale	Hampshire	Dorset	Hampshire X	Dorset X
				Hampshire	Dorset
No. Ewes	43	44	46	30	22
Wool Yield (pounds) ^c	11.2 ^{a, b}	9.6	8.4 ^b	7.8 ^a	9.7
Longevity (per cent) ^d	84	87	78	71	68

a—Group C differed from group HH ($P < 0.01$).

b—Group C differed from group D ($P < 0.05$).

c—Average of 4 years (or less if culled earlier).

d—Measured as the percentage of ewes staying in the flock four years or longer. No test for differences was made due to insufficient numbers born in any one year.

Conclusions

It is difficult to compare the different breeds of ewes retained for flock replacement. There are many factors to be considered when making the decision as to which breed of rams to use on the various breeds of ewes for flock replacement. It is necessary to consider wool production, lambing percentage, and longevity of the ewes retained and their ability to transmit fast and efficient gaining ability to their lambs. Market demands must be considered; specifically, whether heavy or light lambs are desired and the quality or grade of the lambs demanded by the consumer.

Lambs from the Hampshire-sired ewes were slightly heavier at birth and their rate of gain was slightly greater than other breeds studied. The slaughter grade was also greater than for the other breeds. Wool production of these ewes was not as great as the Corriedale but was equal to the wool production of the Dorset.

The Corriedale-sired ewes gave birth to the greatest number of lambs per ewe bred but the per cent of these reaching market age did not differ significantly from the other breeds. The slaughter grade was slightly lower than that of lambs from either the Dorset- or Hampshire-sired ewes.

Birth weights of lambs from the Dorset-sired ewes were as great as those from of the Corriedale-sired ewes but not as heavy as the Hampshire lambs. Average daily gain of the Dorset lambs was no better than the other breeds studied four out of six years. Mortality tended to be lower.

The double-bred ewes, both Dorset and Hampshire, tended to produce lambs that were lighter at birth, made slightly less gain, and graded lower at market than lambs from the single crosses studied.

From this study it would be difficult to rank any one breed over the other in all traits. The choice would depend to a great extent on personal preference, availability of the breed, and market demands.

Summary

Results of comparison of different production traits of ewes sired by different breeds of rams for flock replacement are reported. The study covered a period of six years (1955-1960). Ewe lambs were retained which were from Corriedale, Hampshire, and Dorset sires out of cross-bred western ewes and also from Hampshire- and Dorset-sired ewes. This study was conducted at the Reymann Memorial Farms, a substation of the West Virginia University Agricultural Experiment Station. A total of 150 Corriedale-sired, 150 Hampshire-sired, 154 Dorset-sired, 59 double-bred-Hampshire, and 41 double-bred-Dorset ewes were involved in this study. Comparisons were made of the lambs from these ewes bred to Corriedale, Hampshire, and Dorset rams on the following traits: lambs born and raised per ewe exposed, birth weight, rate of gain, live slaughter grade and livability. Wool production of the ewes retained was also studied.

The data showed only small differences among the various breeding groups of ewes. The most consistent differences were in birth weight, where Hampshire-sired ewes excelled, and in wool production, where Corriedale-sired ewes were outstanding.

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