

It is apparent that neither 3, 3'-diallylhexestrol nor 3, 3'-diallyl-ethylstilbestrol significantly affected protein, calcium, or phosphorus metabolism in these trials, thus it is assumed that under a longer growth trial, gains likewise would not have been affected. In the second trial, diethylstilbestrol was used as a positive control group because many workers have found that this compound promotes increased gains and feed efficiency in sheep. Further work indicated that these effects are realized because diethylstilbestrol increased the efficiency of calcium, phosphorus, and nitrogen metabolism. Since diethylstilbestrol had no effect upon any of the above criteria, it might be assumed that the basal ration was a poor one for this type of study. Failure to obtain growth responses to diethylstilbestrol when added to sheep rations has been noted by other workers, thus it is not likely that this compound will stimulate gains under all conditions under which animals are maintained. Whether, in the present trial, failure to obtain significant response was caused by the ration or by the extreme amount of animal variation within each treatment is not known.

Summary

The oral consumption of 4 mg. daily of 3, 3'-diallylhexestrol, 3, 3'-diallyldiethylstilbestrol, or diethylstilbestrol in two trials involving thirty-one sheep did not affect ration digestibility, or the retentions of ration calcium, phosphorus, or nitrogen.

A Preliminary Summary of the Performance of Raised One-Half Dorset Vs. Purchased Western Ewes

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For many years the majority of the sheepmen in Oklahoma have secured replacements for their ewe flocks from the west. These ewes may have been grade Rambouillets or various crosses of Rambouillets with Panamas, Columbias, Corriedales or Merinos. The ewes vary in their willingness to lamb during the fall, in their prolificacy, in their willingness and ability to care for and nurse their lambs and in the amount of wool produced. At the time of purchasing these ewes (usually as shorn yearlings) one cannot evaluate them for any of the above characteristics. Consequently, it is the usual practice to buy big, smooth-bodied, open-faced ewes and hope that they are what is wanted. Results (Whiteman *et al.* 1960¹ have shown that Rambouillet ewes are superior to several crosses of Rambouillet with Columbia, Panama or Merino for fall lambing.

¹ Whiteman, Joe V., Richard Pittman and Kenneth Urban. 1960. The lambing performance of

It is generally felt that it is better to buy western yearlings than to raise replacements because western yearlings that are ready to breed cost no more than ewe lambs are worth when marketed. Further, the western yearlings are generally freer of internal parasites than are ewe lambs. This decision has not taken into consideration the relative productivity of purchased vs raised replacements.

This is a preliminary report on a study that is under way at the Ft. Reno Experiment Station² to evaluate the question, *ie*, is it economically feasible to raise replacement ewes.

Experimental Procedure

During the spring of 1955 an experimental ewe flock was established at the Ft. Reno Experiment Station. The initial flock was composed of 100 grade Rambouillet and 100 $\frac{1}{4}$ Panama - $\frac{3}{4}$ Rambouillet (RPR) yearling ewes. Purebred Dorset rams were mated to these ewes from 1955 through 1959. Dorset rams were used because a higher percentage of Dorset ewes will breed during May and June than will black faced ewes.

During each of the springs of 1957, 1958, and 1959, forty ewe lambs were raised and forty yearlings purchased. In each year the raised replacements were the first 20 ewe lambs to reach market weight from each group of ewes.

Purchased yearlings have included the following groups:

Designation	Breeding	Year purchased
Panama	Panama	1957
N. Mex. Fine Wool	$\frac{3}{4}$ Ramb.- $\frac{1}{4}$ Merino	1957
Rambouillet	Rambouillet	1958
Market White face	Essentially Ramb.	1958
Columbia X	$\frac{3}{4}$ Ramb.- $\frac{1}{4}$ Columbia	1959
Flying H	Rambouillet	1959

The raised and purchased ewes for each year were placed together and have been handled the same since. During their first breeding season all replacement ewes were bred to small Hampshire rams. During later seasons, the rams may have been Hampshires, Dorsets, Suffolks, or Rambouillets but the raised and purchased groups to be compared were always mated to the same rams.

The breeding schedule used during the four years of the study was as follows:

Year	Breeding Dates	
	Spring	Cleanup
1957	June 3—July 5	Aug. 3—Aug. 23
1958	May 20—June 29	Aug. 11—Sept. 2
1959	May 21—June 30	Aug. 20—Sept. 21
1960	May 21—June 30	Aug. 22—Sept. 23

It should be noted that during 1957, the spring breeding season was for 32 days and cleanup breeding was attempted during 20 days in early August. Poor spring breeding performance resulted in the lengthening of the breeding season to 40 days and the starting of earlier breeding during subsequent years. The cleanup breeding season was lengthened to 32 days after 1958 and moved toward the fall when most effective breeding is generally accomplished in sheep.

Other regular management practices were as follows:

1. Ewes were sheared from five to ten days before the beginning of the spring breeding season. Yearling ewes that were purchased had been sheared before obtaining and were not resheared.
2. All ewes were fed about one-half pound of grain daily for the six weeks before lambing began.
3. All ewes were tagged (crutched) and had their faces sheared about two weeks before lambing began.
4. Ewes were fed one pound of grain daily for six (mature ewes raising single lambs) to nine (young ewes and all ewes raising twins) weeks while on wheat pasture. They also each received about one pound of prairie hay each day.
5. Lambs were self fed in a creep from two to three weeks of age until reaching a market weight of 90 pounds. The creep feed was a mixture of one-third chopped alfalfa hay and two-thirds cracked kafir grain.
6. All of the fall born lambs were marketed for slaughter except for a few ewe lambs that were kept for replacements. Some of the slower gaining winter born lambs did not reach slaughter weight by June 1 and were sold as feeders. It is not known what percentage of the late born lambs could normally be marketed for slaughter.

Reproduction Results to Date

The lambing results obtained thus far are presented in Tables 1 through 4. The summary of the four years lambing and lamb mortality data from the first replacement group (1957) are shown in Table 1.

Table 1.—A Comparison of the Lambing Performance and Lamb Mortality Exhibited by Four Breed Groups of Ewes Contained in the First Replacement Group. (Four Years Production)

	Raised		Purchased	
	Dor. X RPR	Dor. X Ramb.	Panama	N. Mex. Fine Wool
Ewes in breeding flock	77	78	80	77
Ewes lambing in fall	58	59	51	51
Lambs born	80	92	68	57
Lambs raised	72	84	65	51
Ewes lambing in winter	2	6	13	4
Lambs born	3	10	18	5
Lambs raised	3	8	18	5
Total lambs raised	75	92	83	56
Total lambs died	8	10	3	6

It should be remembered that these data represent the production as lambs, yearlings, two year olds, and three year olds for the raised ewes. Yearling, two-year, three year, and four year old production is represented for the purchased ewes. Production was poor for all breed groups the first year which causes all figures to be relatively unsatisfactory. If fall lambing only is considered, the raised ewes have been more productive. This was due largely to their superiority during the third and fourth years. The Dorset X Rambouillet crossbred ewes have out produced the crossbred ewes raised from the one-fourth Panama ewes. The Panama ewes have been superior to the N. Mex. fine wool ewes (part Merino) whose performance has been unsatisfactory.

It should be noted that few raised ewes lambled during the winter. This was mostly because they nearly all lambled during the fall except when lambs. A relatively large number of the Panamas lambled during the winter.

Whereas the first replacement group compares raised replacements to two kinds of purchased ewes that would not be highly recommended, the second replacement group compares raised replacements to the kind of purchased ewes that would be recommended. Table 2 presents the summary of the first three years production of these breeding groups.

After three years of production (lamb, yearling, and two year old for raised ewes and yearling, two and three year old for purchased ewes) the total numbers of lambs raised is essentially the same for the four breed groups of ewes. During their first year of production the purchased yearlings produced more lambs than the raised ewe lambs, but have consistently produced less during later years.

Table 2.—A Comparison of the Lambing Performance and Lamb Mortality Exhibited by the Four Breeding Groups of Ewes Included in the Second Replacement Group. (Three Years Production)

	Raised		Purchased	Mkt.
	Dor. X RPR	Dor. X Ramb.	Ramb.	White Face
Ewes in breeding flock	58	59	59	60
Ewes lambing in fall	43	46	50	43
Lambs born	60	60	58	55
Lambs raised	55	57	54	53
Ewes lambing in winter	7	3	3	10
Lambs born	7	4	5	13
Lambs raised	6	4	5	10
Total lambs raised	61	61	59	63
Total lambs died	6	3	4	5

Results for the third replacement group are presented in Table 3. These results are presented in a different manner for two reasons. First, these are the results obtained when the breeding schedule was as is presently used, *ie.* spring breeding for 40 days starting about May 21 and cleanup breeding for 32 days starting about August 21. Second, we feel that it illustrates about what can be expected during each of the first two years when similar ewes are used.

Table 3.—The First Two Years Reproductive Performance of the Four Breed Groups Represented in the Third Replacement Group.

	Raised		Purchased	
	Dor. X RPR	Dor. X Ramb.	Columbia X	Ramb.
1959 (First year)				
Ewes in breeding flock	20	20	20	20
Ewes lambing	5 (10)*	4 (10)	7 (9)	11 (7)
Lambs born	6 (12)	7 (11)	8 (10)	11 (7)
Lambs raised	5 (10)	7 (11)	8 (8)	11 (7)
1960 (Second year)				
Ewes in breeding flock	19	18	19	20
Ewes lambing	17 (2)	15 (2)	12 (5)	14 (3)
Lambs born	21 (2)	20 (3)	18 (8)	15 (4)
Lambs raised	20 (1)	17 (0) ¹	15 (7)	13 (3)
Total fall lambs	25	24	23	24
Total winter lambs	11	11	15	10
Total lambs raised	36	35	38	34
Total lambs died	5	6	6	3

*Figures in parenthesis represent winter lambing results
¹all deformed

A quick calculation will show that the accumulated percent lamb crop is 92, 92, 97, and 85 percent for these four breed groups of ewes. Although the total production is not as high as desirable for any of these groups, it is felt that the comparisons among the groups are fair. It appears that during their first year's production the purchased yearlings are more productive of fall born lambs and perhaps of total lambs. During their second year's production the raised ewes are more productive of fall born lambs.

It should be noted that the ewes that are part Columbia do not lamb as well during the fall but lamb better during the winter than do the fine wool (Rambouillet) ewes. This tendency has proved fairly consistent throughout experience with these and other ewes. Table 1 showed that a larger number of the Panama (same breeding as Columbia) ewes did not lamb during the fall but lambed during the winter as a result of conceptions during the cleanup breeding season.

Although information concerning lamb mortality has been included in the tables, it is not presently felt that the limited data accumulated justifies any conclusions or discussion. Some preliminary studies have been made of the date on mortality but no conclusions have been reached.

Table 4 summarizes the time of lambing performance of all raised and purchased ewes during their second and subsequent years of production. These data clearly show the superiority of the half Dorset raised replacements relative to percent lambing. Of the 229 half Dorset raised ewes that were 19 months old or older at breeding time, 99 percent lambed either during the fall or winter and over 93 percent lambed during the fall. Of 235 western purchased ewes two years old or older, 89 percent lambed with only 76 percent lambing during the fall. None of the breeding groups of purchased ewes have shown the ability of the raised ewes to lamb during the fall.

Table 4.—A Summary of the Total Lambing Performance of Purchased Vs Raised Replacements During Their Second and Subsequent Years of Production.

	Raised	Purchased
Ewes in breeding flock	229	235
Ewes lambing during fall	214	179
Ewes lambing during winter	13	29
Ewes not lambing	2	27

Note should be made of the number of ewes in the raised vs. purchased classes. More raised ewes have died for various reasons. The reason for this is not known, but the ability to live is an important

characteristic of a breeding animal and continuing observations will be made relative to this trait.

Results to date on rate of early gain of lambs

The rate of gain of lambs until they reach about 50 pounds is most greatly influenced by the lamb's own birth weight and the amount of milk that he gets from his mother. A summary of the information presently available regarding birth weight is presented in Table 5. This summary is presented for both fall and winter born lambs and for single and twin lambs.

The results presented in Table 5 are certainly not conclusive. Both birth weight and rate of early gain are highly variable. Therefore little confidence should be placed in any average value that represents less than 10 lambs. Within this restriction, there seems to be little if any difference in comparing birth weights or rates of early gain between lambs by the raised vs. the purchased ewes. Any difference that exists

Table 5.—A Summary of the Birth Weights and Early Gains¹ of Lambs Produced by the Raised Vs the Purchased Ewes.

Kind of ewe and lambing age	Fall lambs		Winter lambs ²	
	Singles	Twins	Singles	Twins
Half Dorset raised (12-14 mo.)				
Number	18	10	21	1 ³
Weight at birth (lbs.)	8.3	5.5	9.6	7.4
Av. daily gain (lbs.)	.57	.43	.56	.40
Purchased western (19-21 mo.)				
Number	52	2	13	0
Weight at birth (lbs.)	8.3	6.4	10.1	
Av. daily gain (lbs.)	.55	.60 ³	.56	
Half Dorset raised (24-26 mo.)				
Number	64	49	2	
Weight at birth (lbs.)	8.9	7.3	9.5	7.1
Av. daily gain (lbs.)	.63	.52	.66	.47
Purchased western (31-33 mo.)				
Number	68	28	5	4
Weight at birth (lbs.)	9.3	7.4	10.0	7.6
Av. daily gain (lbs.)	.62	.51	.65	.47
Half Dorset raised (36-38 & older)				
Number	45	103	0	0
Weight at birth (lbs.)	10.0	8.2	—	—
Av. daily gain (lbs.)	.67	.56	—	—
Purchased western (43-45 & older)				
Number	51	55	3	5
Weight at birth (lbs.)	9.7	7.7	9.4	9.1
Av. daily gain (lbs.)	.65	.49	.61	.48

¹Average daily gain from birth to approximately 50 pounds.

²1961 winter lambing results not included

³These lambs were raised as singles.

in rate of early gain is in favor of lambs from raised ewes two years old or older.

When the ewes were young the birth weights were heavier for the winter born lambs than for the fall born lambs. Also, both the birth weights and the rates of early gain were greater for lambs from older ewes than for lambs from the first year of production ewes. The well known difference between the average birth weight and daily gain of single vs. twin lambs is well illustrated in these data.

Results to date on wool production

The income from wool usually accounts for 20 to 30 percent of the income from the sheep flock. It is therefore important that some evaluation be made of the relative wool production of the raised vs. the purchased ewes. Since the purchased yearlings had been sheared before purchase, their first year's production represented over 12 months wool growth. No correction could be applied because the amount of extra growth was not known. Consequently the first year's production by purchased ewes was not used for comparative purposes.

The ewes that were raised were sheared May 10 to 15. They sheared about five pounds of wool as six to seven month old lambs. Their first full year's production was between the ages of from six to 18 months. The production during such a period is probably not a good measure of their mature production and was not used for comparative purposes.

Table 6 presents such data as we have at this time. Both grease and clean fleecé weights are given as both are important. Most wool is sold as grease wool but the percent of the wool that is actual wool (clean wool) should help to determine the price. Since Dorset wool is usually drier wool it yields a higher percent of actual wool than does the grease wool from most kinds of western ewes.

Table 6.—The Grease and Clean Wool Production of Raised and Purchased Ewes.

Kind of ewes and year	No. Fleecees	Grease fleece Av. Wt.	Clean fleece* Av. Wt.	Yield %
1959				
Half Dorset raised ewes	38	9.5	5.6	59
Panama ewes	20	11.1	6.6	60
N. Mex. fine wool ewes	18	12.6	5.0	40
% advantage of western ewes		24%	5%	
1960				
Half Dorset raised ewes	76	8.6	4.9	57
Western ewes (pooled)	79	10.3	4.9	48
% advantage of western ewes		20%	0%	

*Clean fleece weight estimated by a Neale squeeze machine.

As was expected the western ewes sheared heavier fleeces, the difference ranging from 20 to 25 percent. Clean fleece weights were essentially the same. If the squeeze machine properly evaluated yield, the fleeces from the raised ($\frac{1}{2}$ Dorset) ewes had a higher percent of actual wool. If all wool were sold at the same price per pound, fleeces from the western ewes would sell for more per fleece. If the buyer differentiates between fleeces with different yields, the wool income would be essentially the same for the two kinds of ewes. It should be remembered that these ewes represent only a small sample of western ewes but the above general conclusion is probably correct *ie.* the loss of grease wool when substituting $\frac{1}{2}$ Dorset for western ewes will probably be greater than the loss of clean or actual wool.

Summary

Three replacement groups of ewes were started at the Ft. Reno Experiment Station during the springs of 1957, 1958, and 1959. Each group was composed of four breeding groups, two of which were raised replacements and two of which were purchased. The first 20 ewe lambs to reach market weight from $\frac{1}{4}$ Panama X $\frac{3}{4}$ Rambouillet ewes and from Rambouillet ewes, both of which were sired by Dorset rams, constituted the raised replacements. Two groups of 20 each of southwestern white faced yearling ewes selected to represent the kind of purchased replacements available were purchased. Within replacement groups the ewes were managed the same.

Two breeding seasons were used. The spring breeding season varied between May 20 and July 5 and a varying cleanup breeding season was attempted between August 3 and September 23. The raised replacements were bred first as lambs, whereas the purchased ewes were bred first as yearlings.

Preliminary conclusions can only be drawn at this time. The purchased ewes produced more fall born lambs during the first year of production but decreased thereafter. The one-half Dorset replacement ewes that were producing their second and later lamb crops displayed a greater tendency for both fall and winter lambing than comparable western ewes. Western ewes that are part Columbia or Panama produce fewer fall born lambs but more winter born lambs than Rambouillet ewes.

There has been little or no difference in the birth weight or early rate of gain (birth to 50 pounds) of lambs produced by the raised vs. the purchased ewes. The purchased ewes sheared more grease wool than the raised ewes but the clean wool production as estimated was about the same for the two kinds of ewes. There has been greater mortality among the raised than among the purchased ewes.

Tests will be continued with these ewes until all have died or been marketed due to old age.