Table 50

Average Endocrine Gland Weights and Teat Length Measurements (Ten Wether Lambs per Lot).

Lot number	1[1]	2[1]	3[1]	4[1]
1955				
Both adrenals, g.	2.6	2.9	3.1	2.8
Both thyroids, g.	2.6	2.9	3.2	3.1
Pituitary, g.	0.68	0.66	0.90	0.74
Teat length, mm.	15.2	20.4	24.6	35.4
1956				
Both adrenals, g.	2.5	3.0	3.8	2.7
Both thyroids, g.	2.2	2.9	2.7	2.9
Pituitary, g.	0.48	0.75	0.68	0.65
Teat length, mm.	20.5	23.0	27.2	27.2

1. Lot 1—Controls. Lot 2—6 mg. implants of stilbestrol. Lot 3—Implants of 3.5 mg. estradiol and 200 mg. progesterone (Synovex).

Observations

The control lambs usually shrank less in transit than the lambs that were given hormone implants or hormone in their feed, but differences were not consistent between the different hormone groups.

The control lambs consistently yielded more than the hormone-treated lambs. The lambs receiving the 6 mg. stilbestrol implants ranked next to the control lambs in yield, while the Synovex-pellet-treated lambs and those receiving stilbestrol in their feed alternated between the lowest and next to the lowest yield.

The lambs receiving the 6 mg. pellets of stilbestrol ranked nearly as high in carcass grade as the control or untreated lambs, while the lambs receiving the estradiol-progesterone implants consistently produced the poorest carcasses. All of the hormone treatments tended to mature the lambs and produced a larger number of yearling carcasses. The hormones caused the pelt to adhere more firmly to the carcass, causing some difficulty in the slaughtering operation.

The hormones caused an increase in the size of the urogenital system and organs of wether lambs. The greatest increase in size was produced the past two years by the Synovex implants and by stilbestrol. No death losses occurred that could be attributed to the hormone treatment in the 1955-56 trials, but the increase in prostate gland tissue tended to occlude the opening of the urethral passage in some of the lambs examined. While the hormones significantly increased the size of the bulbo-urethral glands, the swellings in the rectal region were not so evident as in past years.

The adrenals, thyroids, and pituitary glands were larger and the teats longer in the hormone-treated lambs than in control lambs.

The Effects of Implanting Stilbestrol in Feeder Lambs and Feeding a Stilbestrol Premix to Feeder Lambs upon the Quality and Palatability of the Carcass.

PROJECT 434

David L. Mackintosh, Ralph P. Soule, Jr., T. D. Bell, J. L. Hall, Dorothy Harrison, and Beulah Westerman

Diethylstilbestrol when implanted in growing fattening lambs increases the rate of gain and feeding efficiency, but lowers the yield and the carcass grade. These observations are accepted as a result of work done by several researchers at different experiment stations. None of these investigations made a complete analysis of the carcass; therefore this project was designed to procure additional information regarding the influence of stilbestrol upon the quality and palatability of the carcass.

Ten lambs were selected from each of three lots of 50 head at the Garden City Branch Station and transported to Manhattan where they were slaughtered and carcass observations made. These observations included dressing percentage, cooler shrinkage, content of the alimentary canal, liver weight, kidney weight, total killing fat, pelt weight, carcass grade, mechanical separation of the hotel rack into fat, lean, and bone, area of the eye muscle, thickness of fat over the 12th rib, blood phosphorus, liver glycogen, liver fat, pressed fluid from the eye muscle, total nitrogen, and nonprotein nitrogen of the pressed fluid, palatability tests, and vitamin content of the muscle.

Laboratory observations are not yet complete and four more groups of lambs have been slaughtered recently. Statistical analyses of available data indicate that the rations fed during 1955 did not significantly affect the slaughter weight, dressing percentage, cooler shrinkage, total killing fat, area of the eye muscle, or the nonprotein nitrogen of the pressed fluid.

Liver weight was significantly increased by the addition of 2 milligrams of stilbestrol per day, but not from 6 milligrams implanted at the beginning of the test. The pelt weight was significantly increased in both stilbestrol lots. The carcass grade was significantly lowered in the lot receiving stilbestrol in a premix, while the grade of the implanted lambs was higher than that of the controls. The fat over the 12th rib was definitely thicker in the case of the implants and lower with the premix than in the controls.

Blood phosphorus was definitely lowered in the premix lot, while the liver glycogen in both lots receiving stilbestrol was lower than in the controls. Stilbestrol treatment also reduced the percentage of liver fat significantly. The percentage of moisture in the rib eye was higher in the premix lambs than in either the control or the implanted lambs.

The first year's work on vitamin content of lamb muscle is summarized below:

Vitamin Content of Lamb Muscle

Vitamin	Implants	Premix	Controls
Thiamine	11.6 ug./g.	14.1 ug./g.	10.5 ug./g.
Riboflavin	12.7 ug./g.	13.2 ug./g.	13.7 ug./g.
Pantothenic acid	19.8 ug./g.	22.7 ug./g.	30.3 ug./g.
Niacin	266.6 ug./g.	292.5 ug./g.	328.0 ug./g.

Data from cooking and palatability tests indicate little difference in the quality of the meat on legs of lamb from animals fed a control ration, a control ration plus diethylstilbestrol, and animals implanted with diethylstilbestrol. Legs of lamb from the three treatments lost about 25 percent of their weight during roasting. Meat from all roasts received a high flavor score through 24 weeks of frozen storage, but the flavor of both fat and lean meat deteriorated noticeably after 36 and 48 weeks of frozen storage.

Roasts from animals fed diethylstilbestrol rated slightly more tender, as measured by both judges' scores and shear force values, and yielded a little more press fluid than roasts from other animals. The palatability panel did not score these roasts juicier than the others.

The Relationship of Physical Balance in the Utilization of Pelleted and Nonpelleted Rations for Lambs.

PROJECT 236

T. Donald Bell, Draytford Richardson, R. F. Cox, and J. W. Needham[1]

Lamb-fattening rations varying in proportions of roughages to concentrate have been studied in this project several years. In recent years much interest has been shown by commercial lamb feeders in completely pelleted rations, and for the past three years this project has

1. Grateful acknowledgment is given to Leonard Hays, graduate student in animal husbandry, for help with the feed-lot trials reported in this study.

Table 51

Feed Lot Performance of Lambs Fed Pelleted and Nonpelleted Rations of Varying Concentration.

Lot number	1	2	3	4	5	6
Ration	60% field-cured alfalfa hay, 40% corn pellets[1]	60% dehydrated alfalfa hay, 40% corn pellets[1]	65% chopped alfalfa hay, 35% ground corn, unpelleted	55% chopped alfalfa hay, 45% ground corn, unpelleted	50% field-cured alfalfa hay, 50% corn pellets	50% dehydrated alfalfa hay, 50% corn pellets
Number lambs per lot	22	22	22	21	22	21
Days on feed	79	79	79	79	79	79
Initial wt. per lamb, lbs., av.	77.54	77.32	78.14	77.43	77.96	78.47
Final wt. per lamb, lbs., av.	110.45	107.40	104.68	105.47	109.41	108.28
Total gain per lamb, lbs., av.	32.91	30.08	26.54	28.04	31.45	29.81
Daily gain per lamb, lbs., av.	.416	.381	.336	.355	.398	.377
Lbs. feed per lamb daily:						
Pellet	2.70	2.65			2.48	2.52
Cracked corn			1.21	1.24		
Chopped hay	.48	.44	2.28	1.70	.55	.38
Lbs. feed per cwt. gain:						
Pellet	649.0	697.0			623.3	668.9
Cracked corn			360.1	349.1		
Chopped hay	116.0	114.8	677.7	478.2	138.1	101.6
Feed cost per cwt.	$14.89	$18.50	$17.62	$14.85	$15.32	$18.13
Feed cost per lamb	$4.90	$5.59	$4.68	$4.16	$4.82	$5.40
Number lambs died				1		1

1. .4 lb. chopped hay fed daily after lambs were on full feed.

been designed to study the effect of pelleted and nonpelleted rations of varying proportions of roughages and concentrates upon feed-lot performance and feed efficiency.

Experimental Procedure

The lambs used in the tests were purchased on the Kansas City market in late October and included blackface and whiteface ewe and wether lambs from Colorado. After a short preliminary feeding period, the lambs, weighing approximately 78 pounds, were started on feed. Six lots of 22 lambs each were fed according to the following plan:

Lot 1—Pelleted ration—60 percent field-cured alfalfa hay, 40 percent corn pellets, plus .4 pound of chopped field-cured alfalfa hay per head daily (total ration approximately 65 percent alfalfa hay, 35 percent corn).

Lot 2—Pellet ration—60 percent dehydrated alfalfa meal, 40 percent corn pellets, plus .4 pound of chopped field-cured alfalfa hay per head daily (total ration approximately 65 per cent alfalfa hay and 35 percent corn).

Lot 3—Nonpelleted ration—65 percent chopped alfalfa hay and 35 percent ground corn.

Lot 4—Nonpelleted ration—55 percent chopped alfalfa hay, 45 percent ground corn.

Lot 5—Pelleted ration—50 percent field-cured alfalfa hay, 50 percent corn pellets, plus .4 pound of chopped field-cured alfalfa hay per head daily (total ration approximately 55 percent alfalfa hay and 45 percent corn).

Lot 6—Pelleted ration—50 percent dehydrated alfalfa hay, 50 percent corn pellets, plus .4 pound of chopped field-cured alfalfa hay per head daily (total ration approximately 55 percent alfalfa hay and 45 percent corn).

All the hay used in this test was second-cutting alfalfa taken from the same college field. A portion was dehydrated at the time of cutting and later used in the dehydrated pellets. The remainder was sun cured, baled, and stored in the barn until September, when a portion of it was ground and made into pellets with corn. The chopped hay fed in the test came from the field- and barn-cured supply and was chopped with an ensilage cutter. The corn for all the lots came from the same bulk lot at a Manhattan mill.

The prices charged for the various feeds were as follows: Chopped alfalfa hay, $25 per ton; ground corn, $1.42 per bushel; dehydrated alfalfa meal, $38 per ton; mixing and pelleting, $4 per ton; sacks, $0.10 each; 50 percent sun-cured hay, 50 percent corn pellets, $44 per ton; 50 percent dehydrated hay, 50 percent corn pellets, $50.40 per ton; 60 percent sun-cured hay, 40 percent corn pellets, $41.40 per ton; and 60 percent dehydrated hay, 40 percent corn pellets, $40.08 per ton.

Results and Discussion

Lambs gained faster when fed the pelleted rations than when fed similar, unpelleted feeds in similar proportions. This agrees with results of previous years' tests. The increased rates of gain apparently resulted from greater efficiency of feed utilization rather than increased feed consumption, since the quantity of the pelleted rations consumed was similar to or smaller than that of the nonpelleted rations.

The pellets made of sun-cured hay with corn produced larger and more efficient gains than the pellets made of dehydrated meal and corn. Using the prices indicated, the gains made by the lambs fed dehydrated pellets cost nearly $3 per 100 pounds more than when the sun-cured hay was used.

Slightly larger gains were produced by the pellets containing the higher proportion of roughage, but the advantage in efficiency and economy was not consistent.

As in previous years the ration of 55 percent roughage and 45 percent concentrates was most efficient as well as most economical when nonpelleted rations were fed.

Despite larger gains and greater feed efficiency on pelleted rations

containing 55 percent roughage and 45 percent concentrates, the cost of gain was higher than on the nonpelleted rations. When the rations contained 65 percent roughage and 35 percent concentrates, the pelleted ration containing sun-cured hay and corn produced the cheapest gains, followed by the nonpelleted ration. In this year's tests it should be noted that $4 per ton for mixing and pelleting and $2 per ton for sacks was charged above the cost of nonpelleted rations. This contrasts with charges in previous years when $5 to $8 was charged for grinding and transporting the pelleted feeds. All the lots sold for the same price, and there was little difference in carcass grades of the lambs fed the different rations.

Digestion trials were conducted with lambs, using rations similar to those used in the feed-lot tests, but the chemical analyses are not yet available. Results of these digestion trials will be reported later.

Adaptability of Breeds of Rams and Breed-Types of Range Ewes to Market Lamb Production in Kansas.

PROJECT 347

T. Donald Bell, Lewis A. Holland, and A. W. Gardner

Western ewes of the three predominant types (Texas ewes or fine-wools, Northwest Blackface Crossbreds, and Northwestern Whiteface Crossbreds) commonly found in Kansas were obtained as ewe lambs in the fall of 1951 and bred to Hampshire, Suffolk, Shropshire, and Southdown rams four seasons. A different set of rams has been used each year, and the ewes are being rotated so that no ewes are bred to the same breed of ram each year. Lamb-production and wool-production records are being obtained from the different types of ewes, and lamb-production figures are being obtained for the four sire groups.

Results

Lamb-production figures for the 1954-55 lamb crop are presented in Table 52 and the preliminary lambing data and lamb production for 1955-56 are shown in Table 53.

All of the lambs born on or before December 20, 1955, were separated with their mothers by sire groups and fed separately. The lambs born after December 20 could not be identified into sire groups and were fed as a single group. The ewes in all of the four sire groups were fed similar rations consisting of approximately 4 pounds of alfalfa hay, 4¾ pounds of silage, and 1¼ pounds of grain.

The lambs in each group were creep fed and a record was kept of the concentrate eaten. The creep concentrate mixture was made up of 2 parts oats, 1 part corn, 4 parts milo, 1 part alfalfa meal-corn pellets, 1 part bran, ½ part corn and molasses pellets, and ½ part soybean oil meal. Approximately 3 percent salt was added to this mixture during the later part of the feeding period. The gains and feed consumption of the different groups of lambs are shown in Table 54.

Table 55 gives the average body weights following lambing in the fall of 1955 and early part of 1956 as well as the grease wool shorn the spring of 1956.

Discussion and Observations

The Texas ewes have consistently bred and lambed earlier than the other two types of ewes in the four years that the tests have been conducted. This difference ranged from more than 30 days in the 1954-55 lambing season to an average of 10 days earlier than the Northwest Blackface ewes and 20 days earlier than the Northwest Whiteface ewes in the 1955-56 season. Contrary to popular opinion, the Northwest Blackface ewes have consistently averaged earlier lambing than the Northwest Whiteface ewes. Because of the earlier lambing date, lambs from these Texas fine-wool ewes usually reach market weights earlier than lambs from the other groups. The lambs from the other

Table 52

Lamb Production by Ewes of Different Types from Sires of Different Breeds in 1955.

Breed or breed-type	Number ewes bred	Number lambs weaned	% lambs weaned	Weight 100 days of age	Average weaning weight	Pounds lamb weaned per ewe bred
Ewe types:						
Finewools	50	50	100	68.1	95.4	95.4
Northwest Whiteface	41	34	82.9	79.2	89.8	74.5
Northwest Blackface	50	57	114	76.3	90.6	103.3
Sire groups:						
Hampshire	34	46	135.3	74.3	88.95	120.4
Suffolk	36	43	129.4	80.7	101.34	121.0
Southdown	35	10	28.6	70.8	89.4	25.5
Shropshire	36	42	116.7	67.8	86.71	110.4
Total	141	141	100			

Table 53

1956 Lambing Data and Lamb Production from Ewes of Different Types and from Sires of Different Breeds.

	Ewe types			Sire groups[1]			
	Finewools	Northwest Whiteface	Northwest Blackface	Hampshire	Suffolk	Southdown	Shropshire
Number ewes bred	47	40	49	34	34	33	35
Number ewes lambing before December 20	42	23	35	26	27	25	22
Number ewes lambing after December 20	3	12	6	6	2	8	7
Av. lambing date	11–10	12–5	11–20	11–10	11–7	11–11	11–8
Birth wt., lbs.:							
Singles	9.9	10.1	8.8	9.6	9.5	8.3	9.6
Twins	7.9	9.4	7.0	7.3	7.6	8.3	7.6
% lambs born	127.6	110.0	116.3	105.9	105.9	87.9	85.1
Number lambs alive March 13	54	40	50	32	32	28	25
Av. wt. of lambs March 13	89.2	91.2	91.8	90.0	93.2	88.6	90.1
Number lambs sold March 13	22	14	23	14	20	13	12
Number lambs alive April 9	32	26	27	18	12	15	13
Av. wt. lambs April 6[1]	90.0	90.2	91.9	92.3	91.1	89.1	90.1

1. Lambs born after December 20 not included.