

Table 29  
Swine testing results (1960-61).

BOARS		
	Summer, 1960	Winter, 1960-61
Number on test .....	54 (19 herds)	52 (16 herds)
Av. daily gain, lbs. ....	1.84 (2.43-1.51)	1.76 (2.22-1.50)
Av. backfat, in. ....	1.11 (1.43-0.72)	1.09 (1.42-0.68)
Av. efficiency, lbs. ....	2.64 (2.98-2.34)	2.87 (3.07-2.65)
Av. age at 200 lbs., days .....	147 (123-174)	156 (129-185)
Cost to breeder .....	\$52	\$58
Av. sale price .....	\$172 (\$330-\$90)	\$199 (\$340-\$65)
BARROWS		
	Summer, 1960	Winter, 1960-61
Number on test .....	27 (19 herds)	27 (16 herds)
Av. initial wt., lbs. ....	56	58
Av. slaughter wt., lbs. ....	200	200
Av. daily gain, lbs. ....	1.71 (2.05-1.55)	1.67 (2.13-1.23)
Av. daily ration, lbs. ....	5.5	5.18
Av. feed per lb. gain, lbs. ....	3.20	3.10
Av. daily feed costs .....	\$0.16	\$0.15
Av. feed cost per lb. gain .....	\$0.09	\$0.09
Av. age at 200 lbs., days .....	153 (132-173)	166 (129-195)
Av. backfat, in. ....	1.53 (1.81-1.15)	1.56 (1.73-1.30)
Av. loin eye, sq. in. ....	3.95 (4.74-2.84)	3.93 (4.95-3.06)
Av. % lean cuts .....	48.1 (52.5-43.6)	48.8 (53.0-43.3)
USDA No. 1 .....	17	16
USDA No. 2 .....	10	11

Table 30  
Kansas swine testing ration.  
(Prepared in University feed mill)

	Pounds
Sorghum grain .....	1,544
50% tankage .....	60
44% soybean oil meal .....	200
60% fish meal .....	40
17% dehydrated alfalfa meal .....	60
Cane molasses .....	50
Iodized salt .....	10
Dicalcium phosphate .....	15
Calcium carbonate .....	8
Trace minerals (5% zinc) .....	1
B-complex vitamins (Merck 58-A) .....	2
	Grams
Vitamin A (10,000 I.U. per gram) .....	200
Vitamin D (3,000 I.U. per gram) .....	100
	Pounds
Vitamin E (20,000 I.U. per lb.) .....	1
Aurofac 1.8-1.8 .....	5
Arsanilic acid (Pro-Gen) .....	1
DL-Methionine .....	2
Lyamine (20% lysine) .....	2

Approximate analysis: 16% crude protein; 0.75% calcium;  
0.62% phosphorus.

# Sheep

Corn, Sorghum Grain, Wheat, Rye, and Barley as Concentrates in Complete Pelleted Rations Compared with a Standard Nonpelleted Sorghum Grain and Alfalfa Hay Ration for Self-feeding Fattening Lambs (Project 236).

C. S. Menzies, D. Richardson, and R. F. Cox

Previous experiments at this station have shown that lambs fed complete pelleted rations make faster, more efficient gains than lambs fed similar nonpelleted rations, and that optimum results are obtained when pelleted rations contain around 30 to 40 percent concentrates. This test was designed to study various grains in complete pelleted rations compared with a standard nonpelleted ration.

## Experimental Procedure

Finewool-type mixed ewe and wether feeder lambs were used. Lambs were received October 15. They were shorn and drenched with a commercial fine particle-size phenothiazine drench. November 12, lambs were weighed, ear tagged, divided into six lots of 24 lambs each (144 total), and self-fed the following rations.

- Lot 1. 35% sorghum grain and 65% alfalfa hay, pelleted.
- Lot 2. 35% corn and 65% alfalfa hay, pelleted.
- Lot 3. Mixed nonpelleted ration of 45% ground sorghum grain and 55% chopped alfalfa hay.
- Lot 4. 35% wheat and 65% alfalfa hay, pelleted.
- Lot 5. 35% rye and 65% alfalfa hay, pelleted.
- Lot 6. 35% barley and 65% alfalfa hay, pelleted.

Lambs in each lot, except 3, were fed 10 pounds of chopped alfalfa hay every other day in addition to pelleted rations. Stock salt was supplied free choice. All lambs were implanted with 3 mgs. stilbestrol<sup>1</sup> at start of test.

Brown first-cutting alfalfa hay was used. Hay used in pelleted rations was ground through a ¼-inch screen and the hay fed to lot 3 was chopped. The sorghum grain, corn, wheat, barley, and rye were purchased in bulk. Rye used was a mixture of rye varieties but was of good quality.

Feed prices and processing charges used in determining feed cost per cwt. gain were: sorghum grain, \$1.25 per cwt.; wheat, \$1.71 per bu.; rye, \$0.80 per bu.; shelled yellow corn, \$0.90 per bu.; barley, \$0.70 per bu.; baled alfalfa hay, \$15 per ton; grinding hay, \$5 per ton; chopping hay, \$3 per ton; grinding grain for lot 3, \$5 per ton; grinding grain, mixing and pelleting rations, \$4 per ton. With these prices and charges, feed costs per ton for each lot were as follows: Lot 1, \$25.75; Lot 2, \$28.27; Lot 3, \$22.20; Lot 4, \$36.95; Lot 5, \$27.01; and Lot 6, \$27.22. These are bulk prices, as cost of bags is not included. This would increase feed price for each lot by \$2 to \$3 per ton.

## Results and Discussion

Results are shown in Table 31. Chemical analyses of feeds used are given in Table 32.

Lambs fed the mixed, nonpelleted ration in lot 3 ate less feed and made slower, less efficient but cheaper gains than lambs fed pelleted rations.

There was little difference in rate of gain between lambs fed different pelleted rations. However, lambs fed the sorghum grain-alfalfa pellets consumed more feed and made slightly faster gains. In nonpelleted rations wheat, rye, and barley are generally worth 10 to 15 percent less for fattening lambs than corn or sorghum grain. Wheat and corn pro-

1. Three mgs. stilbestrol implants furnished by Chas. Pfizer and Company, Inc., Terre Haute, Indiana.

29 breeders  
80 boars  
45 barrows

**Table 32**  
**Chemical analyses of feeds fed in pelleted ration study.**

	% Protein N x 6.25	% Ether extract	% Crude fiber	% Mols- ture	% Ash	% N-Free extract	% Carbo- hydrate
Alfalfa hay .....	14.13	1.99	32.77	5.56	8.61	36.94	69.71
(43) Sorghum grain .....	9.06	3.06	2.10	7.05	1.68	77.05	79.15
Lot 1. Sorghum grain-Alfalfa pellets .....	13.94	2.35	20.14	5.67	7.89	50.01	70.15
Lot 2. Corn-Alfalfa pellets .....	12.88	2.72	21.55	5.62	6.63	50.60	72.15
Lot 4. Wheat-Alfalfa pellets .....	13.94	2.08	21.10	5.71	6.45	50.72	71.82
Lot 5. Rye-Alfalfa pellets .....	14.13	2.02	21.12	5.48	6.64	50.61	71.73
Lot 6. Barley-Alfalfa pellets .....	14.25	2.15	22.42	5.66	7.33	48.19	70.61

**Table 31**  
**Corn, sorghum grain, wheat, rye, and barley in complete pelleted rations vs. a standard nonpelleted ration for self-feed-  
ing fattening lambs.**  
November 12, 1960, to February 6, 1961—86 days.

Lot number .....	1	2	3	4	5	6
	Pelleted: 35% sorg. grain, 65% alf. hay	Pelleted: 35% corn, 65% alf. hay	Nonpelleted: 45% ground sorg. grain, 55% chopped alf. hay	Pelleted: 35% wheat, 65% alf. hay	Pelleted: 35% rye, 65% alf. hay	Pelleted: 35% barley, 65% alf. hay
Ration fed .....						
Number lambs per lot <sup>1</sup> .....	24	19	24	24	24	23
Initial wt. per lamb, lbs. ....	61.8	60.2	60.7	59.9	61.6	61.8
Final wt. per lamb, lbs. ....	107.8	102.4	96.0	103.8	105.7	103.2
Total gain per lamb, lbs. ....	46.0	42.2	35.3	43.9	44.1	41.4
Av. daily gain per lamb, lbs. ....	.535	.491	.410	.51	.513	.481
Pounds feed per lamb daily:						
Pelleted ration .....	4.06	3.49		3.58	3.78	3.59
Chopped alfalfa hay .....	.16	.18	1.89	.16	.16	.17
Ground sorghum grain .....			1.60			
Total feed per lamb daily .....	4.22	3.67	3.49	3.74	3.94	3.76
Pounds feed per cwt. gain .....	788.7	747.4	851.2	733.3	768.0	781.7
Feed cost per cwt. gain .....	\$10.17	10.54	9.42	15.42	10.50	10.63
Number lambs not marketed <sup>2</sup> .....	2	2	5	3	2	3
Av. % yield <sup>3</sup> .....	48.0	46.5	47.1	47.9	46.6	47.1
Av. USDA carcass grade <sup>4</sup> .....	10.7	9.6	9.7	9.8	10.5	10.7

1. Four lambs in lot 2 died during test from enterotoxemia, and one lamb from lot 2 and one from lot 6 were removed soon after the test began.

2. Lambs weighing less than 85 lbs. at market time were not sold.

3. Based on hot dressed carcass weight and individual lamb weight at Manhattan just prior to shipment.

4. Based on prime, 14; choice, 11; good, 8; utility, 5; and cull, 2.

duced the most efficient gains. However, because of the high price of wheat, cost per cwt. gain was high for lambs in lot 4.

Lambs in lot 3 fed the nonpelleted ration went off feed several times during the test. Several foundered from overeating but no death loss occurred in this lot. For some reason four lambs fed the corn-alfalfa pellets in lot 2 died from overeating after about 60 days on test.

Because of the nonuniform beginning weights, there were several lambs in each lot that did not reach market weight and finish by the end of the test. The largest number of lambs not sold came from lot 3 fed the nonpelleted ration.

There was about 1/2 USDA carcass grade variation among lots and about 1.5 percent variation in yield among lots.

# Heritabilities, Genetic, and Phenotypic Correlations Between Carcass and Live Animal Traits in Sheep (Project 847).

Carl Menzies, Myron Hillman, John D. Wheat, D. L. Mackintosh, and R. A. Merkel

This is a contributing project to the North Central-50 Regional Sheep Breeding Project. The Kansas State project was initiated in the spring of 1959 to determine relationships between various carcass measurements and live animal traits, to estimate heritability of these traits, and to determine how findings may be applied to selection and breeding of meat-type lambs.

## Experimental Procedure

Ewes and lambs were handled practically the same in 1960-61 as in 1959-60. Procedure followed in handling ewes and rams and lambs during the 1959-60 season was outlined in Kansas Circular 378. Ewes were the same ones used in 1959-60. Ten different yearling Hampshire rams were obtained from various Kansas breeders. Rams were scored for various characteristics by a group of department members, weighed, and probed for fat thickness and loin eye depth at the second lumbar vertebra at the end of the breeding season. Each ram was randomly assigned to a group of 10 ewes. Breeding season was June 6 to September 1, 1960.

Lambs were weighed at birth and have been weighed every two to three weeks since. They are self-fed a pelleted creep ration consisting of 10% poor-quality field-cured alfalfa, 35% dehydrated alfalfa, 45% ground sorghum grain, 7.5% molasses and 2.5% soybean oil meal plus 10 mgs. of Aureomycin per pound of pellets. Ewes are fed all the sorghum silage they will eat plus 1 lb. of sorghum grain and about 2 lbs. of alfalfa hay per head daily. Salt is available free choice. Lambs suckle ewes until slaughtered.

When lambs weigh between 95 and 100 lbs. they are sheared, probed for fat thickness and loin eye depth at the 2nd lumbar vertebra and 20 body measurements are taken. Lambs are slaughtered at the meats laboratory. Various measurements and scores are obtained on the carcasses. Each hotel rack is separated physically. Percentage of ether extract is obtained on a section of the loin eye and intercostal muscle. Each loin is sent to the Home Economics Department where Warner-Brazier tenderness scores, total cooking losses, press fluid, and panel scores on tenderness, flavor, and juiciness are obtained.

## Results and Discussion

See report on page 59 for a brief description of some of the carcass information obtained on lambs slaughtered in 1959-60.

A portion of the data obtained during 1959-60 is reported in Table 33. There were considerable differences in ram type score and weight, and between performance and carcass characteristics of the 10 lamb groups. Gain data were not corrected for sex or type of birth (single or twin) and have not been statistically analyzed.

The Southdown ram used in 1959-60 served as a clean-up ram after the Hampshire rams had been removed and the ewe groups turned to-

Table 33  
1959-60 data on one Southdown and nine Hampshire rams and their lambs.

	Hampshire rams									Southdown ram
Ram number .....	2	3	4	5	6	7	8	9	10	1
Ram type score <sup>1</sup> .....	81.5	90.7	77.8	76.0	79.7	74.0	86.6	82.3	90.5	
Wt. of ram, June 1, 1959 ....	159	206	166	158	153	166	171	174	195	
Total number of lambs .....	8	8	9	9	6	8	10	9	10	10
Av. birth wt., lbs. <sup>2</sup> .....	9.6	8.38	9.54	9.87	9.18	10.20	8.96	10.03	8.6	9.10
Av. slaughter wt., lbs. <sup>3</sup> .....	86.2	87.5	86.9	86.3	85.8	88.0	85.4	86.8	86.2	78.0
Av. age at slaughter .....	127	148	153.7	147	149	137.3	148.8	132.3	157.6	136.9
Av. daily gain, lbs. <sup>3</sup> .....	.708	.615	.593	.598	.595	.645	.543	.670	.576	.546
Av. rib eye area, 12th rib, sq. in. ....	2.13	2.23	2.20	2.23	2.30	2.22	2.24	2.05	2.06	1.96
Av. rib eye area per cwt. carcass, sq. in. ....	4.33	4.48	4.38	4.50	4.67	4.53	4.62	4.24	4.13	4.94
Av. fat thickness, 12th rib, in. ....	.26	.28	.28	.32	.28	.28	.27	.34	.28	.18
Av. marbling score <sup>5</sup> .....	5.37	6.0	5.77	5.44	6.0	5.37	6.30	5.11	6.40	5.70
Av. USDA carcass grade <sup>6</sup> ....	13.0	13.9	14.3	14.4	14.5	13.4	14.2	13.6	14.1	13.8
Av. dressing % <sup>7</sup> .....	50.8	51.4	50.0	51.6	51.1	50.4	50.6	49.9	51.2	47.5
Av. % leg .....	29.4	29.4	31.0	29.5	30.3	30.8	30.5	30.6	30.7	31.2
Av. % loin .....	11.8	11.1	11.5	11.6	12.2	11.0	11.1	11.5	10.0	10.3
Av. % rack .....	11.6	11.5	11.4	12.4	10.9	11.2	11.3	11.8	11.4	10.6
Av. % breast .....	17.5	17.6	17.7	18.5	18.1	18.3	17.7	17.0	17.8	19.1
Av. % shoulder .....	24.7	25.4	24.7	23.8	24.7	25.3	25.1	25.2	25.8	25.0

1. Average general type score, with perfect score being 100.
2. Not corrected for sex or type of birth.
3. Shorn weight taken just before slaughter after lambs had stood over night without feed and water.
4. Based on unshorn weight.
5. Higher score means more marbling.
6. Carcasses graded by USDA grader: Prime, 14; choice, 11; good, 8; etc.
7. Based on shorn slaughter weight and chilled dressed carcass weight.