

day. Replacing the cottonseed meal with 0.72 pound of alfalfa hay cheapened the feed cost per cwt. gain by about 70 cents but increased the daily rate of gain by only 0.02 pound.

Gains made by lambs fed alfalfa hay, milo grain, and salt along with ground Axtell stover, sorghum silage, or Axtell fodder as roughages were approximately the same in all cases. However, use of Axtell fodder cheapened the feed cost considerably at the prices charged for the different roughages. In last year's test, lambs fed sorghum silage plus alfalfa hay as roughage gained faster than lambs receiving either sorghum stover or stover plus alfalfa hay as the roughage part of their ration. However, the lambs this year consumed about 1 pound less silage per day than the lambs did last year.

Rather disappointing results were obtained with wheat silage and alfalfa hay as the roughage. This lot had the lowest gain of any in the test and also a much higher feed cost. These lambs gained well the first part of the test but dropped to only 0.07 pound per day for the last 25 days of the experiment.

The feeding of 14.4 mgs. of aureomycin per lamb per day failed to increase the rate of gain or feed efficiency under conditions of this test. The feeding of aureomycin to lambs implanted with 6 mgs. of stilbestrol did not have any additive effect. These lambs gained about the same as those in lot 2 that were implanted with stilbestrol and fed a similar ration without aureomycin.

The largest and cheapest gains were made by the lambs on wheat pasture. The lambs in this lot that were implanted with 6 mgs. of stilbestrol at the beginning of the test gained about 35 percent faster than those that were not implanted. Results were almost identical with those obtained in last year's test. The increased rate of gain made by the implanted lambs resulted in \$1.38 difference in the final cost per cwt. of lamb.

Only one lamb was lost during this 101-day test. This lamb was from lot number 3 and died from urinary calculi. One lamb died before the experiment started.

Appreciation is expressed to the Eli Lilly Company at Indianapolis, Ind., which furnished the stilbestrol premix fed to the lambs; to the Syntex Animal Products Division of Foundation Laboratories, Inc., of New York, N.Y., for the estradiol-progesterone (Synovex) pellets; and to the Norden Laboratories of Lincoln, Nebr., for the stilbestrol pellets.

The Relationship of Physical Balance in the Utilization of Pelleted and Nonpelleted Rations for Lambs—Metabolism Studies (Project 236).

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Studies at this station and others have shown the importance of ratio of roughage to concentrate in lamb-fattening rations. In recent years, there has been considerable interest in feeding completely pelleted rations. Tests were designed to study the effect of pelleting upon digestibility and percentage of nitrogen retained by lambs fed different ratios of roughage to concentrate, pelleted and nonpelleted. A previous test indicated lowered digestion of fiber in pelleted rations but an increase in digestibility of other nutrients to such an extent that the total digestible nutrient values were essentially the same. Nitrogen retention was greater with the pelleted rations.

Experimental Procedure

Eight crossbred lambs averaging 85 pounds each were used during the winter of 1955-56 to study rations consisting of 60 percent roughage and 40 percent concentrate as pellets, and 50-50 pellets with enough hay to make the ratio 55 percent roughage and 45 percent concentrate.

Also, in the winter of 1956-57 eight crossbred lambs averaging about 90 pounds each were used to study rations containing 65 and 55 percent roughage and 35 and 45 percent concentrate, respectively. Alfalfa and

corn were used as the roughage and concentrate. Where pellets were used, they were made to contain a ratio of roughage to concentrate of 60-40 and 50-50. Enough chopped hay was fed with the pellets to make ratios of 65-35 and 55-45 in the total ration. Each animal served as his own control for the various rations.

Results and Discussion

More work needs to be done to make definite comparisons. The results of these two tests are presented in Tables 12 and 13. They indicate greater digestibility of all nutrients, especially crude fiber, and an increase in nitrogen retention when enough chopped hay was added to 60-40 pellets to make a 65-35 roughage-to-concentrate ratio.

In general, nitrogen retention seems to be greater with pelleted rations; however, quantity of total feed consumption has a great influence on this factor. Rations containing a greater percentage of concentrate seem to be utilized more efficiently. Pelleted rations made from sun-cured alfalfa tended to be more efficient than pelleted rations from dehydrated alfalfa.

Table 12
Results of Digestion and Nitrogen Balance Studies with Lambs Using Varying Ratios of Roughage to Concentrate in Pelleted and Nonpelleted Rations, November, 1955, to January, 1956.

No. of lambs	Ration	% protein	% apparent ether extract	digestibility of crude fiber	% of nitrogen-free extract	% total digestible nutrients	% nitrogen retained
8	60-40 SP ¹	59.46	64.62	20.64	77.58	58.37	7.53
8	60-40 DP ²	51.55	69.26	21.56	72.72	53.32	9.75
7	60-40 HC ³	54.87	57.69	27.11	75.16	55.08	—15.25 ⁴
7	50-50 SP ⁵	69.32	69.42	33.59	83.51	65.85	21.79
7	50-50 DP ⁵	65.92	75.52	35.63	82.59	66.03	16.96

1. 60% sun-cured alfalfa and 40% corn in pellet.
2. 60% dehydrated alfalfa and 40% corn in pellet.
3. 60% chopped alfalfa hay and 40% ground corn nonpelleted.
4. Lambs ate less than one half of normal quantity of feed.
5. Pellets contained 50% sun-cured alfalfa hay and dehydrated alfalfa, respectively, and 50% corn. Enough chopped hay was added to make a 55-45 ratio.

Table 13
Results of Digestion and Nitrogen Balance Studies with Lambs Using Varying Ratios of Roughage to Concentrate in Pelleted and Nonpelleted Rations, November, 1956, to February, 1957.

No. of lambs	Ration	% protein	% apparent ether extract	digestibility of crude fiber	% of nitrogen-free extract	% total digestible nutrients	% nitrogen retained
8	60-40 SP ¹	72.98	61.90	38.31	82.31	63.79	14.18
7	60-40 DP ¹	66.70	67.76	36.81	78.93	59.71	12.20
8	65-35 HC ²	69.24	63.75	44.62	79.81	61.98	5.71
8	50-50 SP ¹	72.12	72.91	36.34	84.02	67.16	19.87
8	50-50 DP ¹	65.32	81.78	36.00	80.77	64.67	17.39
8	55-45 HC ²	72.65	70.84	44.76	83.07	66.73	18.13

1. Sun-cured (SP) and dehydrated (DP) alfalfa was used to make pellets consisting of 60-40 and 50-50, respectively, of roughage and corn. Enough chopped hay was added to make the ratio of roughage to concentrate 65-35 and 55-45.
2. Ration made up of chopped hay and ground corn.

The Relationship of Physical Balance to the Utilization of Pelleted and Nonpelleted Rations for Lambs (Project 236).

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Physical balance of lamb-fattening rations has been studied in this project for several years. This is the fourth year that this project has