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AGRICULTURAL AND MECHANICAL COLLEGE  
AGRICULTURAL EXPERIMENT STATION

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Results of Three Years of  
Lamb Feeding

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## INTRODUCTION

Lamb feeding experiments have been conducted at the Oklahoma Experiment Station for the past several years. This publication summarizes the findings of the experiments for 1930, '31, and '32. It was the purpose of these feeding experiments to determine the comparative value of various feeds grown in Oklahoma. We have included cost of gain figured on feed prices as shown in the tables but have made no detailed financial statement since our main purpose was to determine the comparative value of these feeds. The feed requirement per 100 pounds gain can easily be used as a basis for figuring costs when the local price of the feeds is available.

The principal questions to be answered by the experiments under consideration are:

1. Should a protein supplement be added to a ration of shelled corn and alfalfa hay?
2. Is cut alfalfa hay worth more than whole hay?
3. Can cane hay be substituted for alfalfa hay?
4. How does wheat compare with corn as a grain for fattening lambs?
5. Does it pay to grind wheat?
6. How does sudan hay compare with alfalfa hay?
7. How does cowpea hay compare with alfalfa hay?
8. Does it pay to cut or chop cowpea hay?
9. Is cut cane hay worth more than whole hay?
10. Is cut sudan hay worth more than whole hay?

**Method of Procedure.** These experiments were all conducted in the fall and early winter. The lambs were purchased directly from the West Texas range. They were all white faced lambs, showing a preponderance of fine wool breeding, and were supposedly grade Rambouillets.

**The Allotment of Lambs.** In each trial the lambs were allotted as evenly as possible on a basis of weight, quality and condition. No distinction was made between the ewe and wether lambs.

**Equipment.** These lambs were all fed in the experimental sheep barn, which has an outside paved brick lot. This barn opens to the north and the doors were left open at all times except during stormy weather.

**Weighing.** The lambs were eartagged upon arrival and were weighed individually three successive days at the beginning and the close of the experiment. The average of these three weights was taken as the initial and final weights, respectively. The lambs were weighed at 30-day intervals during the trial.

**Methods of Feeding.** The lambs were all fed in the barn in combination hay and grain racks, the concentrate in each case being fed first. The lambs were allowed about 30 minutes to eat the grain and then hay was placed in the same feed rack. The lambs were fed all the hay they would consume at all times. However, after they had reached full feed the amount of hay fed was all they would clean up without decreasing the grain ration.

**Starting the Lambs on Feed.** When the lambs were unloaded at the experimental barn they were given a feed of prairie hay. After the second or

third feeding the hay used in the experiment was gradually substituted for prairie hay. At the end of three or four days the lambs were getting all the hay they would consume. Grain was offered to the lambs at this time, usually starting with a fifth to a fourth of a pound per head daily. The grain was gradually increased until at the end of 14 to 17 days the lambs received a pound of grain per head daily. After that, the grain ration was further increased but more slowly, and the hay ration gradually reduced until at the end of about three weeks the lambs were getting all of the grain they would consume and what hay they would consume in addition. From time to time the lambs were offered more grain, the purpose being to feed the lambs all the grain they would take at all times.

When a protein supplement was fed it was mixed with the grain and fed as outlined above.

Salt and water were available at all times throughout the experiment.

#### **Should a Protein Supplement be Added to a Ration of Corn and Alfalfa Hay?**

Lots 1 and 3, Table 1, show the comparative feed requirement and rate of gain of the lot with cottonseed meal and the one without. It is the opinion of some feeders that lambs will eat sufficient alfalfa hay to balance the grain ration. On the other hand some feeders contend that the addition of a small amount of protein supplement, especially near the end of the feeding period, is desirable. The practice to follow depends largely on the availability of hay and the cost of different feeds.

In this trial the addition of one pound of cottonseed meal saved 1½ pounds of corn; however, the lambs receiving cottonseed meal ate an additional .7 lb. of alfalfa hay for each pound of cottonseed meal added. The addition of cottonseed meal increased the rate of gain 9.7 percent. If lambs are fed a limited amount of hay, or less than they will consume, it will probably be necessary to add some protein supplement.

#### **Is Cut Alfalfa Hay Worth More Than Whole Hay?**

Cutting or grinding of hay is a practice that is increasing on Oklahoma farms, so the question naturally arises as to the value of this practice and the best method of feeding this ground hay.

Lots 1 and 2 in Table 1 show the comparison of whole and cut alfalfa hay. Lot 2, receiving cut alfalfa hay, ate more grain per day and gained considerably faster than Lot 1, receiving whole hay. The cut hay lot required 26½ pounds more hay and about 30 pounds less grain per 100 pounds gain than the whole hay lot. The cost per 100 pounds gain was 58 cents less in the cut hay lot.

It should be remembered in connection with these results that no charge is made for chopping the hay.

#### **Can Sudan or Cane Hay be Substituted for Alfalfa Hay?**

In all discussions of lamb feeding, thoughts naturally turn to a legume hay, particularly alfalfa. There are a number of feeders in this State who cannot raise alfalfa hay, and in some instances can purchase it only at a greater cost than other roughages can be secured. Hence they are vitally interested in the advisability of substituting some carbonaceous hay for alfalfa. It was the purpose in these tests to feed the carbonaceous hay with a protein supplement sufficient to balance the ration and make the protein content equal to that of the alfalfa hay lot.

According to these two experiments neither sudan nor cane with cottonseed meal can be substituted for alfalfa hay without reducing the rate of gain and increasing both the feed requirement and cost per 100 pounds gain.

However, Jones of the Texas Agricultural Experiment Station, and Cox of the Kansas station, show that the addition of mineral to this sort of ration makes it practically equal to a ration containing alfalfa hay.

**TABLE 1.—Comparing Alfalfa and Cane Hay, Both Cut and Ground; and Comparing Alfalfa Hay and Corn With and Without Protein Supplement.**

(90-day feeding trial)					
Lot No. -----	1	2	3	4	5
RATION	Corn, Whole Alfalfa Hay	Corn, Cut Alfalfa Hay	Corn, C. S. M., Whole Alfalfa Hay	Corn, C. S. M., Cane Hay	Corn, C. S. M., Cut Cane Hay
No. lambs per Lot	20	19	19	19	20
Av. Daily Ration					
Grain	1.44	1.50	1.36	1.14	1.11
Hay	1.37	1.37	1.37	1.36	1.30
Cottonseed Meal			.14	.34	.33
Av. Initial Weight	56.10	53.80	55.30	55.40	53.80
Gain in 30 days	9.40	15.70	15.01	14.60	15.20
Gain in 60 days	21.78	23.90	23.67	22.00	21.65
Gain in 90 days	30.40	33.90	33.50	26.60	25.20
Daily Gain per Head	.336	.377	.372	.295	.280
Feed per 100 lbs. Gain					
Grain	427.4	397.6	366.6	385.8	396.6
Hay	336.5	363.0	369.2	461.6	466.0
Cottonseed Meal			36.6	116.3	119.2
Cost per 100 lbs. Gain	\$8.62	\$8.04	\$8.50	\$9.40	\$9.62

#### COST OF FEEDS

Corn -----	\$ .75 per bu.
Cottonseed Meal -----	45.00 per ton
Alfalfa Hay -----	15.00 per ton
Cane Hay -----	7.00 per ton

#### How Does Wheat Compare With Corn as a Grain For Fattening Lambs?

Lots 1 and 2 in Table 2 show a direct comparison of wheat and corn when fed with whole alfalfa hay. This test shows very little difference in the cost of gain; the wheat lambs consumed more grain and less hay than those on corn, and gained faster. Lots 1 and 6, Table 3, show the second comparison of these two grains. This test is a little more in favor of wheat. Table 4 summarizes the two years' work and the average is in favor of wheat on a basis of total feed requirement.

Although the average of these two years does not indicate any decided advantage for wheat, we feel that it is perfectly safe to say that whole wheat is equal to whole corn, pound for pound, when fed to fattening lambs. These results, however, do not agree with experimental evidence of other stations where it has been shown that wheat is worth less than corn.\*

\*Baker, Marvel L., Nebraska Bulletin 256, April, 1931. Kamalade, W. G., Mimeograph Report, Illinois Station, Dec., 1930. Brown, G. A., Michigan Bulletin 233, May, 1933.

**TABLE 2.—Comparing Whole With Cut Roughages, Carbonaceous With Protein Roughage, and Wheat With Corn, for Fattening Lambs**

(104-day feeding trial)

Lot No. -----	1	2	3	4	5	6
<b>RATION</b>	Whole Corn, Whole Alfalfa Hay	Whole Wheat, Whole Alfalfa Hay	Ground Wheat, Whole Alfalfa Hay	Whole Wheat, Cut Alfalfa Hay	Whole Wheat, Whole Sudan Hay, C. S. M.	Whole Wheat, Cut Sudan Hay, C. S. M.
<b>No. of Lambs per Lot</b>	20	20	20	20	20	20
<b>Av. Daily Ration</b>						
Grain	1.16	1.30	1.05	1.30	1.13	1.14
Hay	1.36	1.30	1.34	1.15	1.11	1.04
Cottonseed Meal					.23	.21
<b>Initial Weight</b>	54.25	54.8	55.3	54.9	55.2	54.9
<b>Final Weight</b>	87.01	89.3	86.03	90.4	81.8	81.01
<b>Gain per Head</b>	32.76	34.5	30.73	35.5	26.6	26.11
<b>Daily Gain per Head</b>	.315	.331	.295	.342	.256	.251
<b>Feed per 100 lbs. Gain</b>						
Grain	366	392	356	381	442	454
Hay	431	392	453	336	436	414
Cottonseed Meal					89.1	84
<b>Feed Cost per 100   lbs. Gain</b>	\$7.48	\$7.49	\$7.53	\$6.94	\$8.20	\$8.19

**COST OF FEEDS**

Wheat -----	\$ .65 per bu.
Corn -----	.65 per bu.
Cottonseed Meal -----	30.00 per ton
Alfalfa Hay -----	15.00 per ton
Sudan Hay -----	8.00 per ton

**Does It Pay to Grind Wheat?**

A comparison of ground and whole wheat fed with alfalfa hay may be found in Tables 2 and 3. The average of these is shown in columns 1 and 2 of Table 4. There is not much difference in the grain requirement per 100 pounds gain between these two lots, but the ground wheat lot required considerably more hay. It will be noticed that the daily consumption of grain was considerably higher in the whole wheat lot. This lot was more highly finished at the close of the experiment.

The grinding of the wheat apparently decreased its palatability, and considerable difficulty was experienced in getting the lambs to eat it.

In figuring the cost of gain no charge was made for grinding the wheat. Unless wheat is being fed in a grain mixture that necessitates grinding, whole wheat is worth more, pound for pound, than ground wheat.

**How Does Cut Alfalfa Compare to Whole Alfalfa  
When Fed With Wheat?**

Table 2 shows a comparison of whole and cut hay when fed with wheat. The lambs receiving cut hay required 11 pounds less corn and 56 pounds less hay per 100 pounds gain than those receiving whole hay.

Table 3 shows another comparison of whole and cut hay when fed with wheat. In this test the lambs getting cut hay required 6 pounds more

grain and 9 pounds less hay per 100 pounds gain than those getting whole hay.

**TABLE 3.—Comparing Whole With Cut Roughages and Wheat With Corn for Fattening Lambs**  
(83-day feeding trial)

Lot No. -----	1	2	3	4	5	6
<b>RATION</b>	Whole Wheat, Whole Alfalfa	Ground Wheat, Whole Alfalfa	Whole Wheat, Cut Alfalfa	Whole Wheat, Whole Cowpea Hay	Whole Wheat, Cut Cowpea Hay	Whole Corn, Whole Alfalfa Hay
No. Lambs per Lot	20	20	20	20	20	20
Av. Daily Ration						
Grain	1.13	1.09	1.15	1.12	1.18	1.16
Hay	1.23	1.21	1.21	1.22	1.12	1.29
Initial Weight	61.08	61.10	60.88	59.96	60.92	60.85
Final Weight	84.30	83.50	83.86	81.30	79.80	83.60
Gain per Head	23.22	22.40	22.98	21.34	18.88	22.75
Daily Gain per Head	.279	.270	.276	.257	.228	.274
Feed per 100 lbs. Gain						
Grain	410	433	416	430	520	424
Hay	446	480	437	471	495	472
Feed Cost per 100 lbs. Gain	\$4.71	\$5.05	\$4.70	\$4.98	\$5.67	\$5.48

**COST OF FEEDS**

Corn -----	\$ .35 per bu.
Wheat -----	.30 per bu.
Alfalfa Hay -----	12.00 per ton
Cowpea Hay -----	12.00 per ton

Table 4 shows the average of two feeding trials. The grain requirement for 100 pounds gain in the whole and cut alfalfa hay lots was practically equal; however, the lot receiving whole hay required about 9 percent more hay.

**TABLE 4.—Comparing Whole Wheat With Whole Corn, Ground Wheat With Whole Wheat, and Whole Alfalfa Hay With Cut Alfalfa Hay**  
(Av. of 2 feeding trials; av. length of feeding trial, 93 days)

<b>RATION</b>	Whole Wheat, Whole Alfalfa Hay	Ground Whole Wheat, Alfalfa Hay	Whole Corn, Whole Alfalfa Hay	Whole Wheat, Cut Alfalfa Hay
No. Lambs per Lot	20	20	20	20
Av. Daily Ration				
Grain	1.23	1.07	1.16	1.22
Hay	1.26	1.27	1.33	1.17
Feed per 100 lbs. Gain				
Grain	401	395	395	399
Hay	419	456	451	386
Av. Daily Gain per Head	.305	.283	.295	.309

### **How Does Sudan Hay Compare With Alfalfa Hay?**

Table 2 also shows the result of a comparison of sudan hay with alfalfa. The object here was again to determine the advisability of replacing alfalfa with a carbonaceous hay. Sufficient cottonseed meal was fed in the sudan hay lots to make the protein content of this ration equal to that in the ration of wheat and alfalfa hay. The results with sudan hay were similar to those shown for cane hay: that is, the feed required per 100 pounds gain and the cost of gain was materially increased when sudan hay was substituted for alfalfa.

### **How Does Cowpea Hay Compare With Alfalfa Hay?**

The poor results secured by substituting carbonaceous hay for alfalfa caused the animal husbandry staff of the experiment station to study the possibility of using a legume hay that might be produced on the average upland farms. Cowpea hay was chosen for this trial.

In Table 3, Lots 1 and 4, is a comparison of whole cowpea hay and whole alfalfa hay when fed with wheat. The feed requirement per 100 pounds gain and the cost of gain are both in favor of alfalfa hay. The difference between these two hays is such, however, that where alfalfa hay cannot be grown, indications are that cowpea hay will make a desirable substitute and that lambs may be fed profitably with cowpea hay as the roughage.

### **Does It Pay To Cut or Chop Cowpea Hay?**

The coarseness of the stems in cowpea hay causes lambs to refuse a greater amount of this hay than they do of alfalfa or similar hay. One lot of lambs was fed on cowpea hay that had been run through an ensilage cutter, and cut in quarter inch lengths. It was thought that reducing the hay to this condition might cause the lambs to eat it more readily. Results were opposite to those anticipated, as the cut cowpea hay was apparently quite unpalatable. Comparisons as shown in Lots 4 and 5, Table 3, indicate that the lambs getting the cut cowpea hay ate a greater proportion of grain to hay than the lots receiving whole cowpea hay. The feed requirement per 100 pounds gain was considerably increased by cutting the hay and the cost of gain was greater. No charge for chopping the hay is included in the figures shown in this statement.

### **Is Cut Cane Hay or Cut Sudan Hay Worth More Than Whole Hay?**

A comparison of whole and cut cane hay is shown in Lots 4 and 5, Table 1. The lambs receiving cut hay required more feed per 100 pounds gain than those receiving whole hay. The cost of gain in the lot receiving cut hay was somewhat greater without including cost of cutting.

Lots 5 and 6 of Table 2 show very little difference between the value of cut and whole sudan hay. There is a slight difference in the amount of grain and hay consumed but the cost of gain is practically equal.

### **SUMMARY**

1. The addition of cottonseed meal to a corn and alfalfa hay ration decreased the grain requirement per 100 pounds gain 5.8 percent and increased the hay requirement about 10 percent. The rate of gain was increased 11.6 percent by the addition of the cottonseed meal.
2. Lambs fed whole corn with whole alfalfa hay required 7½ percent more grain and 7 percent less hay than those fed a like ration with cut alfalfa hay. The cutting or chopping of alfalfa hay when fed with whole wheat without a protein supplement reduced the hay requirement per 100 pounds gain 7.8 percent (average of two trials). The grain requirement for the cut and whole alfalfa hay lots was practically equal.

3. The lot receiving cane hay, corn and cottonseed meal required 25 percent more concentrate and 25 percent more hay per hundred pounds gain than the lot getting corn, cottonseed meal and alfalfa hay. Sufficient cottonseed meal was fed in the cane lot to make the nutritive ratio equal to the alfalfa hay lot.
4. The lot receiving whole wheat and whole alfalfa hay required about 7 percent more grain and 9 percent less hay per 100 pounds gain than the lot receiving whole corn and alfalfa hay. However, the wheat lot gained 5 percent more per head daily than the corn lot. The lot receiving whole corn fed with alfalfa hay required 3.4 percent more grain and 5.8 percent more hay than the lot receiving whole wheat.
5. When fed with whole alfalfa hay without a protein supplement, the whole wheat lot required 10 percent more grain and 13 percent less hay per 100 pounds gain than did the ground wheat lot. The daily gain was 12 percent greater in the whole wheat lot.
6. The lot receiving sudan grass hay, cottonseed meal and wheat required about 35 percent more grain and 11 percent more hay per 100 pounds gain than the lot receiving alfalfa hay.
7. The lot receiving cowpea hay and wheat required 5 percent more grain and 5.6 percent more hay per 100 pounds gain than the lot receiving a ration of wheat and alfalfa hay.
8. The lot receiving the ration of wheat and cut cowpea hay required 21 percent more grain and 5 percent more hay per 100 pounds gain than the lot receiving whole cowpea hay.
9. When fed with corn and cottonseed meal sufficient to balance the ration, cutting cane hay increased slightly the feed requirement per 100 pounds gain and reduced the rate of gain as compared with the lot receiving whole cane hay.
10. There was very little difference in the feed requirement between the lots getting cut and whole sudan hay.